“EFFICACY SAFETY AND TOLERABILITY OF TOPICAL SERTACONAZOLE 2% , LULICONAZOLE 1% AND TERBINAFINE 1% IN SUPERFICIAL CUTANEOUS MYCOSES (TINEA CORPORIS) ”

This dissertation is submitted to

THE TAMILNADU DR.M.G.R.MEDICAL UNIVERSITY

In partial fulfillment of the requirement of the award for the degree of

M.D BRANCH XX

DERMATOLOGY, VENEREOLOGY AND LEPROSY

STANLEY MEDICAL COLLEGE

CHENNAI – 600 001

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DECLARATION

I solemnly declare that the dissertation titled **Efficacy, Safety and Tolerability of Topical Sertaconazole 2%, Luliconazole 1% and Terbinafine 1% in superficial cutaneous mycoses (Tinea corporis)** was done by me at **Government Stanley Medical College and Hospital during 2010-2013** under the guidance and supervision of my Chief **Dr. V. Anandan, M.D.,**

The dissertation is submitted to **THE TAMILNADU DR.M.G.R.MEDICAL UNIVERSITY** towards the partial fulfillment of requirement for the award of **M.D. Degree (Branch XX) in DERMATOLOGY, VENEREOLOGY & LEPROSY.**

Place: Dr. M.MANI SURYA KUMAR

Date:

CERTIFICATE

Certified that this dissertation entitled **"EFFICACY SAFETY AND TOLERABILITY OF TOPICAL SERTACONAZOLE 2% , LULICONAZOLE 1% AND TERBINAFINE 1% IN SUPERFICIAL CUTANEOUS MYCOSES (TINEA CORPORIS) "** is a bonafide work done by **Dr. M.MANI SURYA KUMAR** post Graduate Student of the Department of Dermatology, Venerology and Leprosy, Stanley Medical College, Chennai – 600 001 during the academic Year 2010 – 2013. This work has not been submitted previously for the award of any degree.

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TOPICAL ANTIFUNGALS

Topical antifungals are routinely used for the treatment of mild dermatophyte infections. Extensive dermatophytic infections and infections of hair and nails which affect the quality of life of people are treated with systemic anti fungals. The most commonly used topical antifungal agents are

- Allylamines
- Imidazoles
- Morpholines and
- Polyenes.

Older medications like whitfield ointment, castellani or paint of magenta, gentian violet and undecyclic acid are now replaced by specific agents. Most of the specific anti fungals act on the various steps involved in the synthesis of fungal cell membrane.

Advantages of topical antifungals are less cost, easy application, less adverse effects and less interaction with other drugs. New topical anti fungals are introduced in the market which show more efficacy, safety and increased persistence in skin for longer periods.

Aim of our study is to assess the efficacy, safety and tolerability of Sertaconazole 2%, Terbinafine 1% and Luliconazole 1% in treatment of superficial cutaneous mycoses (Tinea corporis)

SUPERFICIAL CUTANEOUS MYCOSES (TINEA CORPORIS)

FUNGI

Fungi are ubiquitious and play an important role in degradation of organic matter. Previously they were considered as descendants of the kingdom of plants. But later they were classified as a different kingdom. They are both saprophytes and parasites. They are different from bacteria and virus based on certain biochemical properties like lysine synthesis. They have all the features of eukaryotic organisms like presence of rigid cell wall, mitochondria, ribosome, membrane bound nucleus and chromosomes[1].

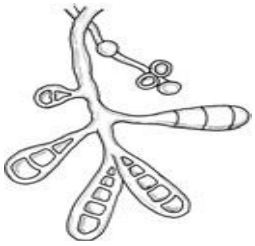
CLASSIFICATION OF FUNGI

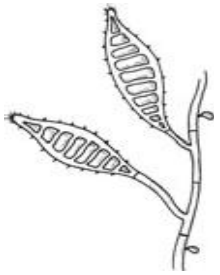
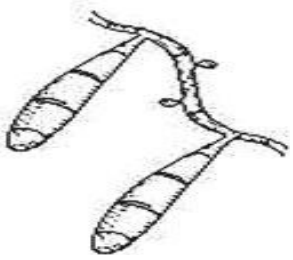
Phylum	**Growth Form**	**Hyphae**	**Sexual Propagules**	**Asexual Propagules**
Zygomycota	Moulds	Broad few septa	Zygospores	Sporangiospores
Ascomycota	Moulds Yeasts	Narrow regular Septa	Ascospores	Conidia
Basidiomycota	Moulds Yeasts	Narrow regular Septa clamp Connections	Basidiospores	Conidia
Deuteromycota	Moulds Yeasts	Narrow regular Septa	None	Conidia

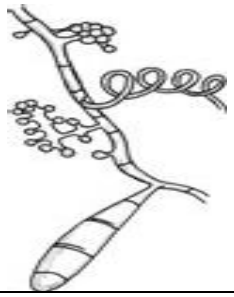
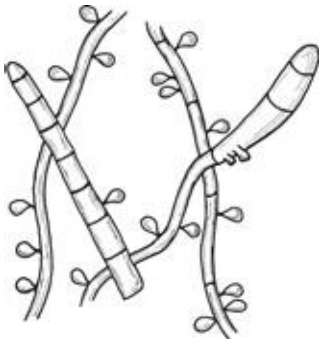
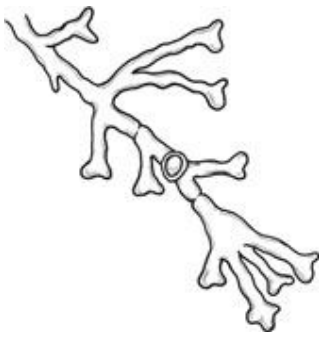
CULTURE CHARACTERISTICS AND MORPHOLOGY

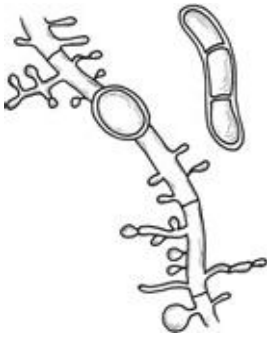
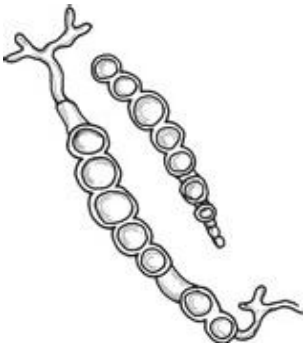
Sabouraud's dextrose agar (SDA) (dextrose 40 g; agar 20g; peptone 10g and distilled water) is the most commonly used isolation medium. Cycloheximide (0.5 g/L) and chloramphenicol (0.05 g/L) inhibit bacteria, making the medium highly selective for the isolation of dermatophytes. Commercial versions of this agar are Mycosel and Mycobiotic. Dermatophyte test medium (DTM) contains the pH indicator phenol red; it turns red when dermatophyte proteolytic activity increases the pH to 8 or above. Potato dextrose agar (PDA) stimulates the production of conidia and pigment. Finally, species of Trichophyton are often differentiated by their nutritional requirement, revealed on Trichophyton agar by numbers 1 to 7[(2-10)].

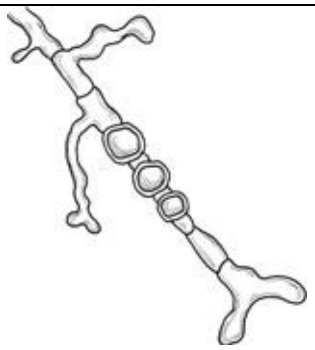
Standardization of media is essential. Cultures are incubated at room temperature (26C/78.8F) for up to 4 weeks. With more than 40 known dermatophytes, proper identification requires a suitable reference source.

Organism	**Colony Morphology**	**Microscopic Appearance**
E.floccosum[(11-14)]	Flat feathery colonies with a central fold and yellow to dull grey-green pigment. Yellow to brown on reverse pigment 	No microconidia, numerous thin and thick-walled, club-shaped macroconidia.

P0oM.audouinii	Flat and white to grey with widely spaced radial grooves. Tan to salmon reverse pigment. Salmon-pink pigment on PDA. No growth on polished rice. 	Terminal chlamydoconidia and pectinate (comb-like) hyphae
M. canis	Flat, white to light yellow, coarsely hairy, with closely spaced radial grooves. Yellow to orange on reverse pigment - Yellow on PDA. Growth on polished rice 	Few microconidia, numerous thick walled and echinulate macroconidia with terminal knobs.
M. gypseum	Flat and granular with tan to buff pigment, no reverse pigment 	Few microconidia, numerous thin walled macroconidia without knobs

T. mentagrophytes	White to creamy with a cottony, mounded surface. Non to light brown reverse pigment. No pigment on PDA Urease positive. 	Clustered round microconidia, rare cigar-shaped macronconidia, occasional spiral hyphae. Hair perforation positive.
T.rubrum	Mounded white center with maroon periphery. Maroon reverse pigment Cherry red on PDA. Urease negative 	Few tear-shaped microconidia, rare pencil-shaped macroconidia Hair perforation negative.
T.schoenleinii	Heaped or folded and whitish. Colorless to yellow-tan reverse pigment. 	Knobby antler-like hyphae (favic chandeliers), numerous chlamydoconidia.
T. tonsurans	Suede-like center with feathery periphery,	Numerous multiform

	white to yellow or maroon color. Reverse pigment usually dark maroon, sometimes none to yellow. Partial thiamine requirement. 	microconidia and rare cigar-shaped macroconidia.
T.verrucosum	Small and heaped, though sometimes flat, white to yellow-grey. Reverse pigment none to yellow. Requires thiamine and usually inositol for growth. 	Chains of chlamydoconidia on Sabouraud dextrose agar. Long and thin "rat-tail" macroconidia with thiamine.
T.violaceum	Waxy and heaped, deep purplish-red. Purple reverse pigment. Partial thiamine requirement.	Irregular hyphae with intercalary chlamydoconidia. No micro-or macroconidia on SDA, rare micro-and macroconidia with thiamine.

PATHOGENESIS:

Host factors which prevent fungal infection are UV light, temperature and moisture, competition from normal flora, and fungistatic fatty acids and sphingosines produced by keratinocytes. . After adherence, fungi penetrate the stratum corneum at a rate faster than desquamation [15, 16]. Penetration is due to secretion of proteinases, lipases, and mucinolytic enzymes. Trauma and maceration also facilitate penetration [17-20]. Defense mechanisms emerge once the deeper layers of epidermis are reached, like competition for iron by unsaturated transferrin and inhibition of fungal growth by progesterone [21]. Degree of inflammation depends on system activation.

Chemotaxis of inflammatory cells plays a major role. Fungi produce low-molecular weight chemotactic factors like bacteria. Activation of complement also produces chemotactic factors. Keratinocytes induce chemotaxis by releasing IL-8. Accumulating macrophages inhibit fungal growth by free radical nitric oxide. Fungal mannans inhibit inflammation and phagocytosis.

Skin contains antimicrobial peptides like human β-defensins, cathelicidin and dermicin. These peptides are active against bacteria, viruses and fungi [22].Type IV, or delayed – type hypersensitivity (DTH), plays a major role in clearing dermatophytoses. This is due to interferon-gamma produced by type 1 T-helper lymphocytes (TH1 cells). Primary infection cause minimal inflammation, and a trichophytin skin test in negative. The infection produces mild erythema and scale, due to increased keratinocyte turnover. Dermatophyte antigen is processed by Langerhans cells and presented in local lymph nodes to T lymphocytes [(23-26)]. The T lymphocytes undergo clonal proliferation and migrate to the dermis and epidermis to attack the fungus. Lesion becomes inflammatory, and epidermal barrier becomes permeable to transferring and migrating cells. Soon the fungus is cleared and the lesion spontaneously resolves. The trichophytin skin test is now positive, and clearing of a second infection will be more rapid. Patients with IgE-mediated, immediate hypersensitivity (IH) reaction to the trichophytin skin test, are prone to chronic dermatophytoses, usually with T.rubrum[23].

Dermatophytid reactions are inflammatory reactions of the skin at a site distant from the primary fungal infection. These are KOH examination and culture negative. Lesions are follicular papules, erythema nodosum, pityriasis rosea like, erythema multiforme like, vesicular id of the hands and feet,

erysipelas-like, erythema annular centrifugum, or urticaria. They disappear with resolution of the primary lesion. Intradermal test is positive.

SUPERFICIAL CUTANEOUS MYCOSES:

HISTORICAL ASPECTS:

Study on superficial fungal infection started before 150 years. Remak described the mycelia nature of favus. In 1841, Gruby isolated the organism of favus in culture and experimentally reproduced the disease with inoculation in normal skin. In 1910 Raymond Saboraud classified dermatophytes into four genera based on their microscopic and clinical characteristics. In 1934, Emmons' described three genera - Epidermophyton, Microsporum, and Trichophyton.

CLASSIFICATION:

Very Superficial: Pityriasis versicolor , Piedra and Tinea nigra

Superficial: Dermatophytoses like Tinea corporis, Tinea cruris ,

Tinea faciei, Tinea barbae , Tinea pedis and Candidiasis

TINEA CORPORIS (TINEA CIRCINATA):

Tinea corporis refers to all dermatophytoses of glabrous skin except the palms, soles, and groin.

EPIDEMIOLOGY:

Tinea corporis is transmitted directly from infected humans or animals, via fomites, or via autoinoculation. Occlusive clothing, a warm humid climate, frequent skin-to-skin contact, and minor trauma are associated with more frequent and severe eruptions. There is a high prevalence of disease even in the absence of an epidemic.

Tinea imbricata, caused by T.concentricum, is limited to areas of Far East, South Pacific, and South and Central Amercia. There is also genetic susceptibility[27].

CLINICAL MANIFESTATIONS:

The classic presentation is an annular lesion with well demarcated, raised and scaly erythematous border. The border is studded with vesicles and advances centrifugally. The center of the lesion shows clearing. Lesions are seen on exposed skin. Immunosuppresion modifies the presentation. Presence of inflammatory changes is determined by the species and immunity of host. Pustules or vesicles can be seen in borders.

Various presentations of Tinea corporis:

M.canis infections are characteristically annular. In T.verrucosum infections the characterisitic finding is annular lesion.

Various types of presentation due to T.rubum are extensive lesions[28], psoriasiform and vasculitic lesions. Tokelau disease due to T.concentricum, is autosomal recessive in nature. The infection starts as a scaly ring with centrifungal spread, but later forms ring within ring pattern. Pruritus is intense and lead to lichenification. There is negative delayed hypersensitivity to T.concentricum cytoplasmic antigen, resolves with hypopigmentation [29, 30].

Atypical forms of tinea corporis like extensive forms, subcutaneous nodules [31], and abscess occur. Rarely there is involvement of underlying structures like bone and lymph nodes.

VARIANTS OF TINEA CORPORIS:

Noninflammatory:

- Tinea Circinata
- Bullous tinea corporis
- Tinea imbricata

Inflammatory:

- Kerion of glabrous skin Majocchi's granuloma
- Nodular granulomatous perifolliculitis of the legs
- Agminate folliculitis
- Subcutaneous abscess (tinea profunda)
- Mycetoma

- Tinea faciale
- Tinea incognito

LABORATORY DIAGNOSIS:

The most common diagnostic procedures are direct observation of fungi, culture and molecular diagnostic procedures.

DIRECT MICROSCOPY:

Direct microscopy is done with the use of 10% potassium hydroxide. The scrapping materials are obtained from active margins with the help of disposable scalpel blade. If the scaling is minimal then scales are obtained with adhesive cello tape. If blisters are present the roof is nicked off and material is obtained. The scrapping material is transported in a black paper and mounted on a slide containing 10% KOH. The slide containing the scrapping material is warmed with Bunsen burner. The cover slip is pressed firmly. Excess KOH on slide is removed because it may damage the lens. Examination should be done under bright light illumination, but sometimes over illumination makes it difficult to diagnose the fungi. Other agents like 10% sodium sulphide and 35% dimethyl sulphoxide can be used. Other stains like Parker stain, congo red and methylene blue can be used to enhance the visibility of the fungus. The most recent method is Fluorescence microscopy using acridine orange which stains the polysaccharide present in fungal cell wall. The characteristic findings are

septate hyphae. They branch but do not constrict at the branching point [32-41]. We should rule out mosaic fungus which is nothing but intercellular deposit of cholesterol which mimicks mycelium.

HISTOPATHOLOGY:

PAS stains of tinea circinata shows red hyphae within the stratum corneum – sandwich sign. Hyphae are basophilic with hematoxylin and eosin, and stain black with methenamine silver. If organisms are absent, the histopathology is nonspecific and resembles an acute or chronic dermatitis. The nodular perifolliculitis variant, caused by T.rubrum, shows a perifollicular granulomatous reaction accompanied by central necrosis and suppuration. Organisms are present in the hairs and dermis and large spore (6 um) may be found within multinucleated giant cells [42].

CULTURE:

Most of the superficial cutaneous mycoses do not require culture as mandatory because direct microscopy is sufficient to confirm diagnosis and start treatment. But certain infections like Tinea capitis and otomycosis require culture to identify the species because of the difference in response of various dermatophytes to antifungal. The most common culture medium used is Sabourauds dextrose agar. It contains 1% peptone and 2% sugar. Anti bacterials

like 0.005% chloramphenicol and 0.04% cycloheximide are added to inhibit the growth of bacteria and non dermatophytic moulds [2-10].

MOLECULAR DIAGNOSTICS:

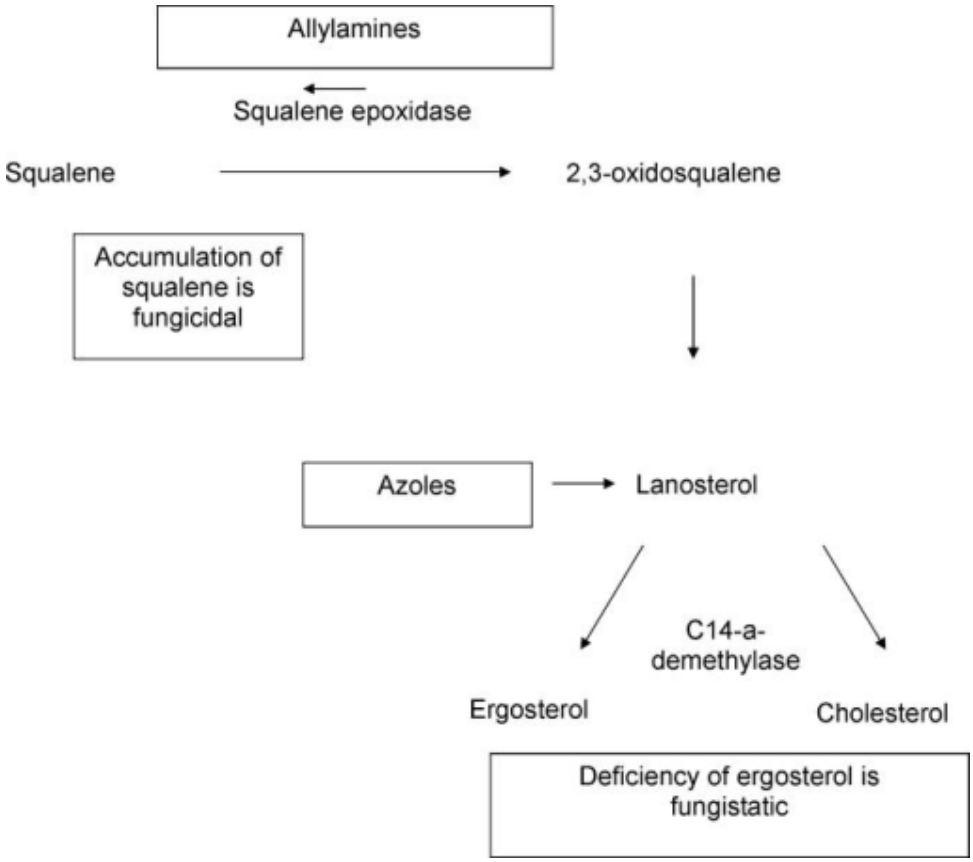
Recently molecular diagnostic procedures like Polymerase chain reaction are used for the identification and classification of dermatophytes. The major advantage is that diagnosis can be achieved within a short period of 48 hrs. But the disadvantage is cost effectiveness [43-46].

DIFFERENTIAL DIAGNOSIS:

Tinea corporis resembles many skin diseases, though diagnosis is usually straight forward.

Seborrhoeic dermatitis is usually symmetrical lesions with greasy scales and is associated with seborrhoeic dermatitis of the scalp and other seborrhoeic areas. Psoriasis is characterized by erythematous raised scaly plaques on classical sites like elbows, knees and lumbosacral area with additional findings like pitting of nails. Impetigo often leads to confusion particularly of the circinate type. Lichenified lesions on leg resemble lichen simplex chronicus. Nummular eczema is characterized by symmetrical lesions on limbs. Pityriasis rosea especially Heralds patch is a close differential diagnosis since it occurs on trunk, but can be differentiated by fungal scrapping.

TOPICAL ANTIFUNGAL AGENTS



Superficial fungal infections, including dermatophytoses are most often restricted to the epidermis. Factors guiding management include.

- Extent and severity of the infection,
- site of involvement
- co-morbid conditions or potential drug interactions, if any,
- anticipated efficacy of treatment
- cost and access to medication, and
- Ease of use.

Patients with limited fungal infections confined to glabrous skin are usually best treated with topical agents. Advantages of topical antifungals over systemic include:

- less side effects
- less drug interactions
- localization of treatment
- low cost

Various topical antifungals are available. Non-specific topical treatments, like salicylic acid, gentian violet and Castellani's paint which were once the mainstay of treatment are now replaced by specific antifungals.

Classification of Topical antifungals:

(1) imidazoles,

(2) allylamines and benzylamines, and

(3) polyenes and Miscellaneous

(1) IMIDAZOLES

Imidazoles are a broad group of antifungal medications. In this group certain medications like clotrimazole have been around for decades, while others like sertaconazole, are recently available.

MECHANISM OF ACTION:

Imidazoles inhibit lanosterol 14a-demethylase, a cytochrome P dependent enzyme, which converts lanosterol to ergosterol. Depletion of ergosterol results in membrane instability and hyperpermeability, Imidazoles are fungistatic.

Anti-inflammatory activity is through inhibition of neutrophil chemotaxis, calmodulin activity, synthesis of leukotrienes and prostaglandins, and histamine release from mast cells. Anti inflammatory effects of ketoconazole is equivalent to effect of 1% hydrocortisone. Imidazoles also possess limited antibacterial properties.

PHARMACOKINETICS:

Imidazoles penetrate stratum corneum well due to keratinophilic nature. Sertaconazole has a half-life within the stratum corneum of more than 60 hours. Systemic absorption of imidazoles is low. Urinary excretion is 0.3 % to 1.0 %. Even when applied to inflamed skin, absorption of imidazoles is only 4 % [47].

INDICATIONS:

Dermatophytosis,

Candidiasis

Seborrheic dermatitis

Erythrasma,impetigo and ecthyma.

Topical imidazoles are available as a cream or lotion. Though lotions are suitable for large areas or hair-bearing skin , cream may be more effective[48].

DOSING REGIMEN:

Econazole, ketoconazole, and oxiconazole are approved for once-daily dosing but twice-daily dosing is recommended for the remainder. Application should include normal skin radius of 2 cm beyond the lesion. Duration of treatment varies. Tinea corporis and tinea cruris require treatment for 2 weeks; tinea pedis may require treatment for up to 4 weeks. Treatment should be continued for at least 1 week after all symptoms have resolved.

RISKS AND PRECAUTIONS:

Combination with the topical betamethasone dipropronate is more effective than clotrimazole alone in reducing symptoms. But after stopping the combination striae and other cutaneous side effects are reported. High relapse rate has also been reported.

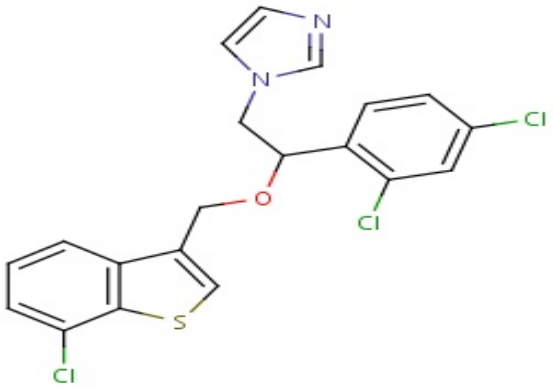
COMPLICATIONS:

Due to low systemic absorption, drug interactions with topical imidazoles are rare. However increased serum tacrolimus levels were reported in renal transplant recipients who used topical clotrimazole for mucocutaneous

candidiasis. Hence nystatin can be used in treating thrush in transplant patients using tacrolimus.

Resistance of Candida albicans to clotrimazole is reported in HIV patients.

SERTACONAZOLE NITRATE 2% CREAM:



Sertaconazole is an imidazole antifungal agent. Mode of action is inhibition of the synthesis of ergosterol, an essential cell wall component of fungi. Indications are treatment of superficial skin mycoses such as dermatophytosis (including tinea corporis, tinea cruris, tinea mannum, tinea barbae and tinea pedis), cutaneous candidiasis, pityriasis versicolor and seborrhoeic dermatitis of the scalp[49].

Sertaconazole has broad-spectrum antifungal activity against Trichophyton, Epidermophyton and Microsporum genera, and yeasts of the genera Candida and Cryptococcus and also it is effective against opportunistic

filamentous fungi and Gram-positive bacteria. Though the drug has good dermal penetration, it is not associated with systemic absorption.

It is a potent fungicidal with antibacterial, antinflammatory properties with less relapse rate and beclamethasone is a chlorinated mid potent steroid with little systemic penetration. Combination of these two molecules may be more effective than existing therapies in relieving symptoms of erythema, scaling, pruritus, maceration and mycological cure rates.

DRUG INTERACTIONS:

Potential interactions between Sertaconazole nitrate Cream, 2% and other drugs are not yet established.

STUDIES IN SPECIAL POPULATION:

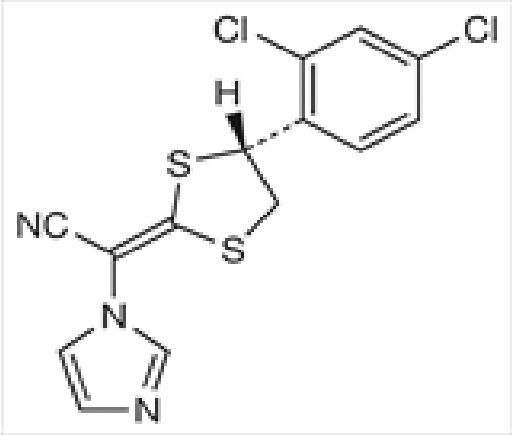
Nursing Mothers: Sertaconazole nitrate Cream, 2% secretion in human milk is unproved but since drugs are excreted in human milk, caution should be used while prescribing Sertaconazole nitrate Cream, 2% to feeding women.

Pediatric Use: The efficacy and safety of Sertaconazole nitrate cream, 2% in pediatric patients below the age of 12 years is not yet fully established

ADVERSE REACTIONS:

The reported cutaneous side effects are contact dermatitis, dry skin, burning skin, application site reaction and skin tenderness.

LULICONAZOLE 1% CREAM:



Luliconazole is a recently developed imidazole . Mechanism of action is similar to other imidazoles in inhibiton of Lanosterol 14a – demethylase. It shows remarkable antifungal activity against dermatophytes. Luliconazole is also characterized in that its retention in the stratum corneum is extremely high[50].

It demonstrates greater potency against Trichophyton spp. (MIC range : <0.00012-0.002 ug/ml) in particular T. rubrum . Luliconazole was also highly active against Candida albicans (MIC range: 0.031-0.13 ug/ml). Further the MIC of luliconazole against Malassezia restricta, and important pathogenic agent involved in seborrhoeic dermatitis is very low (MIC range: 0.004-0.016

ug/ml) suggesting action comparable to ketoconazole. Since there is no systemic absorption, adverse effects are rare.

DRUG INTERACTIONS: There are no reported interactions with other drugs.

STUDIES IN SPECIAL POPULATION:

There are no reported adverse events in pregnant and lactating women.

(2) ALLYLAMINES AND BENZYLAMINES

Allylamines and benzylamines are closely related compounds.

MECHANISM OF ACTION:

Allyamines and benzylamines have similar action. They reduce synthesis of ergosterol by inhibition of squalene epoxidase. It is an enzyme which converts squalene to squalene epoxide. Reduced ergosterol results in membrane instability and hyperpermeability. They are fungicidal. Both are independent of cytochrome P enzyme system.

They demonstrate anti-inflammatory activity by inhibition of chemotaxis, and inhibition of lipoxygenase. Allylamines and benzylamines show limited antibacterial properties[51].

PHARMACOKINETICS:

Allyamines and benzylamines are highly lipid soluble and penetrate the stratum corneum effectively and persist for longer duration. Butenafine persists in stratum corneum for at least 72 hours after application, and terbinafine persists for upto 7 days after application. Systemic absorption is quite low, with urinary excretion of 3 to 5 % of the applied dose

INDICATIONS:

Indications for the use of topical allylamines and topical benzylamines have been detailed. Despite antibacterial properties, terbinafine has proven inferior to mupirocin for treatment of impetigo, and a traditional antibacterial agent should be used instead. Similarly, although allylamines and benzylamines do demonstrate activity against dimorphic fungi involved in systemic infection such as Sporothrix schenckii, Blastomyces dermatitidis, and Histoplasmosis capsulatum, topical therapy is inappropriate in this situation.

Limited evidence suggests that topical allylamines or benzylamines may be preferred over topical imidazoles for certain dermatophyte infections. Repeated trials for tinea pedis indicate that 1 week of topical terbinafine is as effective as 4 weeks of topical imidazoles, with cure resulting in 53 % to 95 % of cases. Use of this abbreviated treatment with terbinafine has been confirmed in trials using the active agent versus vehicle alone. In some instances,

resolution of tinea pedis using terbinafine as occurred with as few as three doses[52.]

Currently a 30-g tube of terbinafine is three times more expensive than a 30-g tube of clotrimazole. Considering the frequency of application, the amount of medication required the likelihood of patient compliance and ease of use, and the rapidity of results, some experts recommend topical terbinafine over topical imidazoles for tinea pedis. Nevertheless, using the same data, other experts have recommended initial use of less expensive imidazole therapy with reservation of allylamines and benzylamines for treatment failure. A consensus has not yet been achieved.

Finally, topical allylamines and benzylamines are effective against candida or pityrosporum spp. However given the relative cost of these agents compared to cheaper, equally reliable, and specifically approved agents, such as imidazoles, polyenes, ciclopiroxolamine, and over-the counter selenium sulfide, there is no compelling reason to turn away from these more affordable options.

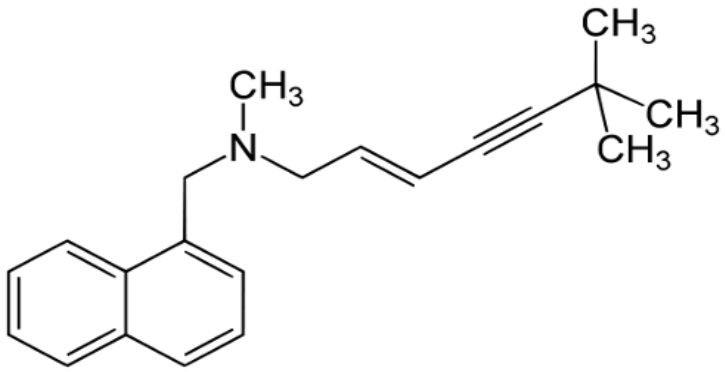
DOSING REGIMEN:

Topical allylamines and benzylamines are available in a number of forms. Each agent has a slightly different dosing regimen based upon the formulation and the location and severity of infection.

RISKS AND PRECAUTIONS:

Risks associated with use of topical allylamines and benzylamines are those inherent to all topical medicaments.

TERBINAFINE 1% CREAM:



Terbinafine belongs to the allylamine class of antifungal agents. It inhibits squalene epoxidase, a membrane-bound enzyme. It is not part of the cytochrome P-450 superfamily. It is fungicidal to dermatophytes[53-55].

Terbinafine exhibits fungicidal action against dermatophytes, Aspergillus species and dimorphic fungi. In vitro activity against yeasts has been weaker and varied. Terbinafine is fungicidal against C. parapsilosis but fungistatic against C. albicans[54].

Terbinafine is well absorbed and highly lipophilic and keratophilic, and is distributed throughout adipose tissue, dermis, epidermis, and nails where it persists for weeks. It is delivered to the stratum corneum via the sebum and, to a lesser extent, through incorporation into the basal keratinocytes and diffusion

through the dermis-epidermis. Terbinafine is not found in eccrine sweat. Terbinafine is metabolized in the liver. In patients with renal disease, the elimination half-life can become prolonged.

MAJOR DRUG INTERACTIONS:

Concurrent use of terbinafine with caffeine, theophylline and napthylline may increase their toxicity; alcohol and hepatotoxic drugs may increase the risk of liver damage. Drugs that induce the cytochrome P-450 system may increase the clearance of terbinafine and drugs that inhibit the cytochrome P-450 system may decrease the clearance of terbinafine.

STUDIES IN SPECIAL POPULATION:

Children: There is limited experience with terbinafine in children

ADVERSE REACTIONS:

- Local cutaneous side effects like mild burning, irritation, and erythema.
- Hypersensitivity reactions, including Stevens-Johnson syndrome and toxic epidermal necrolysis.
- Gastrointestinal effects like nausea, dyspepsia, stomach pain, reversible loss of taste and hepatitis.
- Hematologic effects like neutropenia and pancytopenia.

COMPLICATIONS:

Complications occurring with use of topical allylamines or benzylamines are few.

(3) POLYENES:

Polyenes are the first to be discovered to possess specific antifungal properties. The two major topical polyene antifungals are nystatin and amphotericin B. Only topical nystatin is maximum available in market.

MECHANISM OF ACTION:

Nystatin binds irreversibly to membrance sterols and alters membrane permeability leading to leakage of essential intracellular components. Nystatin is fungistatic, but in high concentration it may be fungicidal.

PHARMACOKINETICS:

Nystatin is insoluble in water. It is not absorbed from intact skin, the gastrointestinal tract, or the vagina.

INDICATIONS:

Topical nystatin is used to treat mucocutaneous candidiasis. Since topical imidazoles are more effective than nystatin in treating vulvovaginal candidasis, use of nystatin has diminished in recent years. Nystatin is not effective against dermatophytes or pityrosporum.

DOSING REGIMEN:

Nystatin is available as a powder, cream, ointment, suspension, and pastille. To treat oral candidiasis (thrush), the suspension is used four to five times daily, usually for 2 weeks. To treat cutaneous infection, the powder, cream, and ointment are used twice daily for approximately 2 weeks.

RISKS AND PRECAUTIONS:

Allergic contact dermatitis to nystatin has been reported with both topical and oral use. Analphylaxis has been reported but it is attributed to ingredients other than nystatin.

Addition of triamcinolone may provide additional benefit during initial stages when inflammation is maximal. After this initial period, nystatin alone is used. Although triamcinolone acetonide is only a mid-potency agent, cutaneous sequelae, including striae, skin atrophy, and steroid-induced acne, has been reported.

COMPLICATIONS:

Complications are few. Nystatin resistance has been encountered.

OTHER AGENTS:

Some topical antifungals, such as whitfield ointment, castellani paint, ciclpirox olamine, tolnaftate, and undecylenic acid, do not fit well into the major classes and are instead discussed separately.

1. WHITFIELD OINTMENT:

It is composed of 3% salicylic acid and 6% benzoic acid in ointment base. Salicylic acid acts as a keratolytic agent and and benzoic acid acts as fungicidal agent.

2. CASTELLANI OR PAINT OF MAGENTA:

Castellani′s paint is useful in management of tinea cruris and moniliasis of intertriginous areas, pustular dermatoses of the hands and feet, pruritusani and pruritus vulvae.

COMPOSITION:

Basicfuchsin	Acetone
Ethylalcohol	Resorcinol
Boricacid	Water
Phenol	

It is applied to affected areas at night with a cotton-tipped applicator and then dried and dusted with talc.

3. CICLOPIROX OLAMINE:

Ciclopirox olamine is a hydroxypyridone antifungal agent with a unique structure and mode of action.

MECHANISM OF ACTION:

Unlike most other topical antifungals, ciclopirox olamins does not interfere with sterol synthesis. Instead, it interrupts active membrance transport of essential cellular precursor's particularly trivalent cations. Ultimately this disrupts cellular functions leading to death of the fungus. If concentrations of the drug are high enough the membrane integrity of the fungus may actually be impaired.

Ciclopirox olamine also has inherent anti-inflammatory activity exerted through inhibition of prostaglandin and leukotriene synthesis within polymorphonuclear cells. Broad-spectrum antibacterial properties have also been attributed to ciclopriox olamine.

PHARMACOKINETICS:

When applied is the skin, ciclopirox olamine remains in high concentration within the epidermis and upper dermis. Ciclopirox olamine penetrates keratin easily. This ability to penetrate keratin recommends use for onychomycosis. Approximately 10 % of the administered dose is excreted in the urine.

INDICATIONS:

Ciclopirox olamine is indicated for the treatment of dermatophytoses and onychomycosis, candidiasis, pityriasis versicolor, seborrheic dermatitis, and even cutaneous infections with unusual saprophytes. In tinea pedis, a mycologic cure rate of up to 85% has been observed, and in seborrheic dermatitis a significantly larger percentage of users had >75% improvement with 2 weeks of use than those using the shampoo vehicle alone.

Although treatment with ciclopirox olamine for tinea pedis and seborrheic dermatitis has yielded results on par with other modalities, use in onychomycosis has met with more modest success. Often an assessment of efficacy depends upon whether a mycologic cure (culture negative) or clinical cure (a disease-free nail) defines success. Although a disease-free nail is often the patient's true goal, ciclopirox olamine achieved such a response in just 5.5 % to 8.56 % of those treated with a standard 48-week course. Two recent trails demonstrated increased efficacy when using oral terbinafine in combination with topical cicloprox olamine, as opposed to oral terbinafine alone. Debate regarding the use of ciclopirox olamine as an independent or adjunct treatment for onychomycosis is ongoing.

DOSING REGIMEN:

Circlopirox olamine is available in a wide range of forms. Cutaneous candidiasis, dermatophytoses, and pityriasis versicolor should be treated twice

daily for 2 weeks to 1 months, but treatment for tinea pedis should continue 1 month or longer. While using ciclopirox shampoo for seborrheic dermatitis treatment done twice weekly for an indefinite duration. Improvement is generally noted in 2 to 4 weeks. Finally, in treating onychomycosis, the nail lacquer is applied daily to the nail and hyponychium for 48 weeks and excess medication is removed weekly with alcohol.

RISKS AND PRECAUTIONS:

Risks associated with use of topical ciclopirox olamine are those inherent to all topical medicaments. Allergic contact dermatitis has been reported only rarely, and ciclopirox olamine is considered a weak sensitizer. In patients with an allergic reaction to ciclopirox, imidazoles may be used with relative safety because of a markedly different chemical structure.

COMPLICATIONS:

Serious complications with topical ciclopirox olamine are few.

OLDER AGENTS:

Tolnaftate and undecylenic acid are older agents now available only in over-the-counter products. Repeated studies have now demonstrated that they are approximately equal in efficacy, and that both are less efficacious than topical imidazoles, allylamines, benzylamines, and ciclopirox olamine.

Additionally, tolnaftate is ineffective for treating candidiasis. Additionally topical forms of undecylenic acid may yield an unpleasant fishy smell that further discourages use. Because both agents are considered less efficacious than imidazoles, monitoring for treatment failure is indicated when using these medications.

SYSTEMIC ANTIFUNGAL AGENTS:

1. GRISEOFULVIN:

It is a heterocyclic benzofuran derived from penicillium griseofulvum .

MECHANISM OF ACTION:

Mode of action is inhibition of formation of intracellular microtubules which disrupts the mitotic spindle and prevents cell division of the fungus.

PHARMACOKINETICS:

Griseofulvin is poorly absorbed after oral administration because of its poor solubility in water hence it is advised to take along with a fatty meal and also in micronized form.

The peak levels are achived in serum 4 hours after drug administration. 84% is bound to albumin and has low affinity for keratin. The drug is fungistatic and persists in the skin and nail for a very short time - 2 weeks after discontinuation of treatment.[51]

It is predominantly metabolized in liver and excreted in urine. Its half life is 9 to 22hrs.

INDICATIONS:

Griseofulvin has a narrow spectrum of activity against dermatophytes only.[56]

INTERACTIONS:

Warfarin needs dosage adjustment. Dose of griseofulvin is to be increased while on barbiturates. It should not be administered during pregnancy because of the risk for developing conjoined twins.

ADVERSE EFFECTS:

Hypersensitivity, oral thrush, nausea, vomiting, epigastric distress, diarrhoea, headache, dizziness, insomnia, mental confusion, Liver failure, photosensitivity and precipitation of porphyria . It is contraindicated in pregnancy as it causes conjoined twins

Dose: 10 to 20 mg / kg Bw

2. FLUCONAZOLE

It is a triazole which inhibits the enzyme lanosterol 14 alpha demethylase. The oral bioavailability is greater than 90%. The peak plasma concentration is 1to 2 hours and half-life is 20 to 50 hours.

Fluconazole has low lipophilicity and low level of plasma protein binding. It is excreted by renal system[57].

INDICATIONS:

Fluconazole has proved safe and effective in the treatment of, dermatophytosis and fingernail and toe nail onychomycosis.

DOSE:

150 mg, 300 mg or 450 mg once weekly for 9 - 12 months.

INTERACTION:

Cisapride, terfenadine, Cimeditine and rifampicin decreases plasma concentration of fluconazole. Hydrochlorothiazide increases plasma concentration of fluconazole. It increases plasma concentration of cyclosporin, astemizole, glipizide, phenytoin, rifabutin, tacrolimus . Prothrombin time is increased with anticoagulant.

ADVERSE EFFECTS:

Headache, skin rash, nausea, vomiting, diarrhoea, palpitations, sweating, fever.

3. ITRACONAZOLE

It is a triazole derivative & disrupts the synthesis of ergosterol.

It is highly lipophilic and oral bioavailability is maximum when taken with a full meal. Approximately 95% is bound to plasma albumin. It has a high affinity for keratinized tissues. It persists for upto 6 months after discontinuation of therapy.

Itraconazole is predominantly metabolised by the CYP 3A* iso-enzyme. 18% is excreted through feces and 40% of the dose is excreted as inactive metabolites in the urine[58].

INDICATIONS:

Effective for dermatophytes, Candida and nondermatophyte moulds.

DRUG INTERACTIONS:

Plasma concentration is decreased by carbamazepine, phenobarbitone, phenytoin, proton pump inhibitors and nevirapine.

Plasma concentration is increased by erythromycin, clarithromycin, indinavir, ritonavir.

ADVERSE EFFECTS:

Tremor, herpes zoster, abnormal dreaming, congestive heart failure and pulmonary edema have been reported.

CONCLUSIONS:

Because of relatively low cost, acceptable efficacy, ease of use and low potential for side effects, complications or drug interactions, topical antifungal are preferred for most superficial fungal infections of limited extent. Alternatively use of a systemic agent is justified when a superficial fungal infection covers a large surface area, involves terminal hair or nails, or has proven recalcitrant to prior topical management. Imidazoles provide a reasonable balance of efficacy and affordability and are indicated for treatment of dermatophytoses, mucocutaneous candidiasis, and pityrasis versicolor. Despite higher cost, allylamines and benzylamines may be advantageous in some cases of tinea pedis, due to shorter treatment courses. Cicloprix olamine is a topical antifungal with a unique mechanism of action and a broad range of indications. Topical nystation is useful in treating mucocutaneous candidiasis,

but is ineffective for dermatophyte infections. Use of tolnaftate and undecylenic acid is decreasing due to lower efficacy compared with other available agents.

Localized tinea corporis, shows good response with topical therapy given twice daily. Topical terbinafine often works in a shorter time (e.g. 2 weeks). In extensive cases, systemic therapy is preferred for about 2-3 weeks. Griseofulvin, requires long-term treatment. Reinfection with T.concentricum is common in endemic area, as there is no long-lasting immunity.

TREATMENT FAILURE

Failure of topical therapy is due to faulty diagnosis, wrong use of topical therapy, or poor compliance.

To assess the efficacy of Sertaconazole nitrate 2 cream vs terbinafine 1% cream and luliconazole 1% cream in patients with Superficial cutaneous mycoses (Tinea corporis).

STUDY DESCRIPTION

Study design - Randomized, Prospective, open label, parallel group.

Study place - Dept of Dermatology, Govt. Stanley medical college & hospital, Chennai

Source of patients - Patients attending Dermatology OPD and referred from other Departments

Study period - August 2011 to December 2011

Duration – 5 months

Number of Patients – 90

Number of groups – 3

Group A (n=30): Sertaconazole nitrate 2% cream twice daily topical for 4 weeks followed by 2 weeks observation for relapse.

Group B (n=30): Terbinafine 1% cream once daily topical for 4 weeks followed by 2 weeks observation for relapse.

Group C (n=30): Luliconazole 1% cream once daily topical for 4 weeks followed by 2 weeks observation for relapse.

INCLUSION CRITERIA:

1.	Male – 18 to 70 years.
2.	Female (post-menopausal, surgically sterilized or practicing a reliable method of birth control) - 18 to 70 years of age
3.	Tinea infections, confirmed by laboratory evaluation (microscopic examination confirmed by a positive potassium hydroxide (KOH) test) with inflammatory dermatoses.
4.	Written informed consent by patient.
5.	Patient willing to follow up.

EXCLUSION CRITERIA:

1.	Though there are no proven contraindications, Pregnant and lactating women are excluded as a safety measure.
2.	Patients who took oral or topical treatment with antimycotics during the 4 weeks before trial
3.	Immunocompromised (patients taking steroid, immunosuppresants or HIV/AIDS)

4.	Associated bacterial infection.
5.	Hypersensitivity to Sertaconazole nitrate, beclomethasone dipropionate, miconazole or base of cream.
6.	Specific types of dermatophytoses like Majocchi granuloma which require systemic therapy

SCREENING VISIT:

History of the patients will be noted. Patients will be assessed based on the inclusion and exclusion criteria. Written informed consent will be obtained. Clinical assessment of the condition will be carried.

STUDY PLAN:

After screening, patients who fulfill inclusion criteria, willing to take part in trial and sign consent letters are advised to apply a thin film of study medication twice daily at morning and night on the affected area that has been cleansed and dried. One finger tip unit is applied in a circular fashion over affected area including surrounding normal skin. Patients are advised to come for follow up on 7^{th}, 14^{th}, and 28^{th} day & and follow-up visit on 42^{nd} day of study medication for assessing the safety, efficacy and tolerability. Depending

on the response, study medication will be continued upto 4 weeks or stopped early after 2 weeks.

CLINICAL EFFICACY PARAMETERS:

At each of the visits, clinical efficacy shall be assessed as follows:

a) Clinical evaluation of the disease assessed in accordance with the efficacy parameters

	Visit I Baseline / Day 0)	**Visit II (Day 7/Wk I)**	**Visit III (Day 14/ Wk I1)**	**Visit IV (Day 28/Wk IV**	**Visit V (Day 42/ Wk VI**
Pruritus					
Erythema					
Desquamation					

Severity scale: worse-1, none or no improvement 0, Mild improvement 1, Moderate improvement 2 and clinical cure 3.

b) Mycologic assessment for Tinea and Candida species (Based on KOH test)

	Visit I (Baseline /Day 0)	**Visit II (Day 14/ Wk II)**	**Visit III (Day 28/Wk IV)**	**Visit IV (Day 42 /Wk VI)**
Mycologic assay				

Note: + ve for KOH; -ve for KOH

c) Physician Global assessment of clinical response scale:

Tick the appropriate box (□)

		Visit I (Day 14/ Wk II)	**Visit II (Day 28/Wk IV)**	**Visit III (Day 42/Wk VI)**
Successful treatment outcome	Effective clinical treatment – ❖ Mycology –ve in addition to marked improvement over baseline signs and symptoms or ❖ Clinical cure (mycology –ve in addition to normal appearance of skin)			
Clinical success	Effective clinical treatment – ❖ Marked improvement over pretreatment in signs and symptoms; at most, mild residual erythema and /or scaling ❖ Clinical cure (normal appearance of skin in all treated cutaneous dermatophytosis and or candidiasis completely resolved)			
Clinical failure	Worsening of clinical status ❖ Some pretreatment signs and symptoms of cutaneous dermatophytosis are more			

	severe or new symptoms are present ❖ Mild clinical improvement or no change (pretreatment signs and symptoms have decreased or significant evidence of disease remains); or ❖ Moderate clinical improvement (pretreatment signs and symptoms have decreased)			

Overall efficacy, safety and tolerability of Sertaconazole , Terbinafine and Luliconazole were assessed based on Quartile grading scale and Dermatology life quality index.

QUARTILE GRADING SCALE:

Grade 1 - <25%, minimal to no improvement

Grade 2 - 26–50%, moderate improvement

Grade 3 - 51–75%, marked improvement

Grade 4 - 75%, near total improvement

DERMATOLOGY LIFE QUALITY INDEX :

0-1 = no effect at all on patient's life

2-5 = small effect on patient's life

6-10 = moderate effect on patient's life

11-20 = very large effect on patient's life

21-31 = extremely large effect on patient's life

INVESTIGATIONS:

The following investigations will be done at the start of the study (screening visit) and again repeated at the end of treatment period to assess tolerability of the study drug.

- **Hematology and Serum Biochemistry:**

  Haematology will include haemoglobin, total leucocyte count, differential leucocyte count, total RBC count, platelet count & ESR.

  Biochemistry will include SGOT, SGPT and random blood sugar.

- **Urinalysis**
  - Pregnancy tests in female patients in the reproductive age group.

LABORATORY INVESTIGATIONS

Parameters	**Screening Visit I**	**Visit III or Visit IV**
Haemogram		
Hb gms/dl		
Total R.B.C/µl		

Total W.B. C/µl		
Polymorphs%		
Lymphocytes%		
Monocytes %		
Basophils%		
ESR mm/hr		
Serum Biochemistry		
SGOT IU		
SGPT IU		
Fasting Blood glucose mg%		
Sr. Creatinine mg%		
Sr. BUN mg%		

- Urinalysis
    - Pregnancy tests in female patients in the reproductive age group.

WITHDRAWAL OF PATIENTS IS DONE UNDER FOLLOWING CONDITIONS:

1. Request of the patient.
2. Repeated protocol criteria violation and non-compliance with its specification.
3. Patient is lost to follow up

4. Serious adverse event/ reactions / intercurrent illness where continuation of study poses serious risk to the patient.
5. Patients who develop signs & symptoms of hypersensitivity.
6. Patients who become pregnant during the study period.

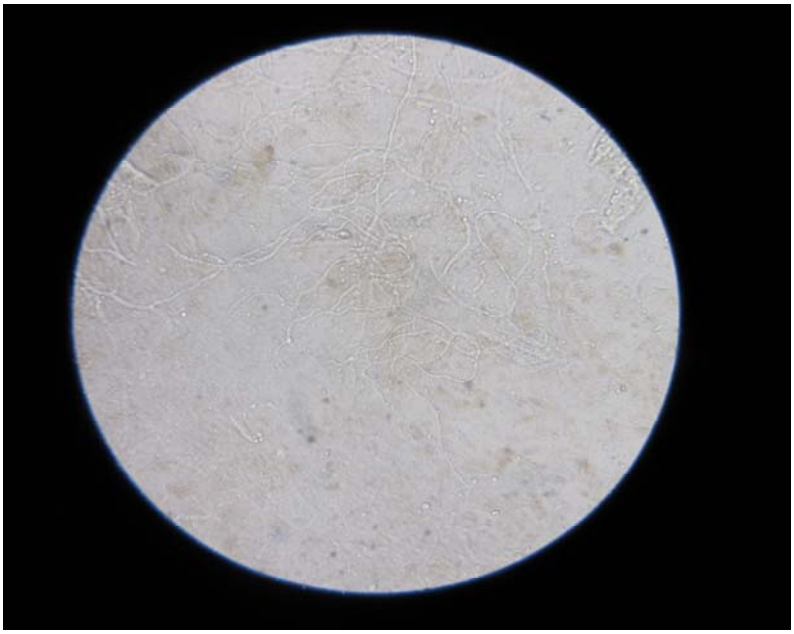
CLASSICAL TINEA CORPORIS

PSORIASIFORM TYPE

TINEA IMBRICATA

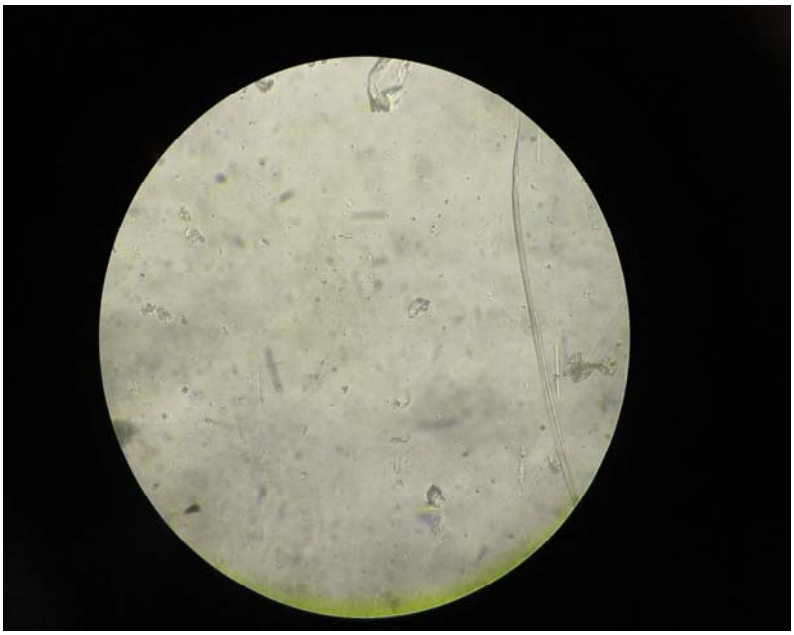
TINEA INCOGNITO

BEFORE TREATMENT

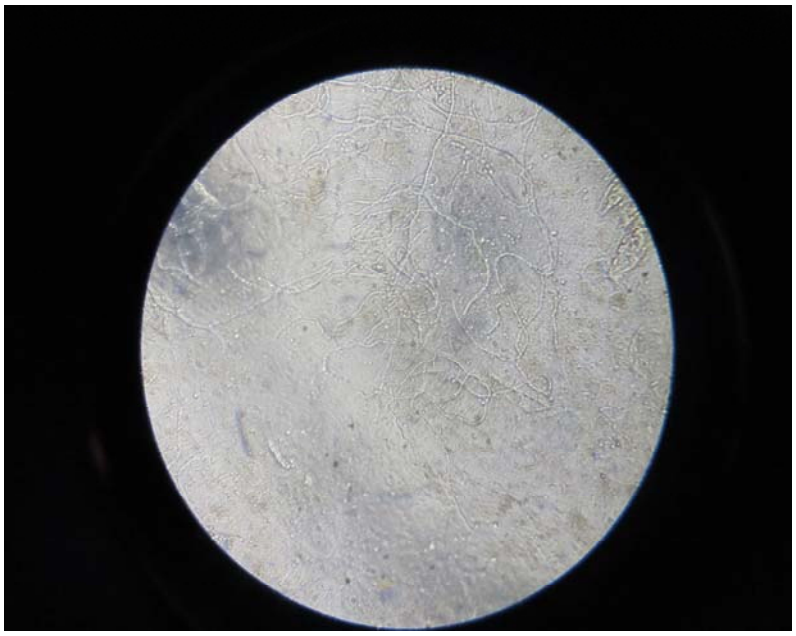


Skin scrappings showing branching septate hyphae

AFTER TREATMENT

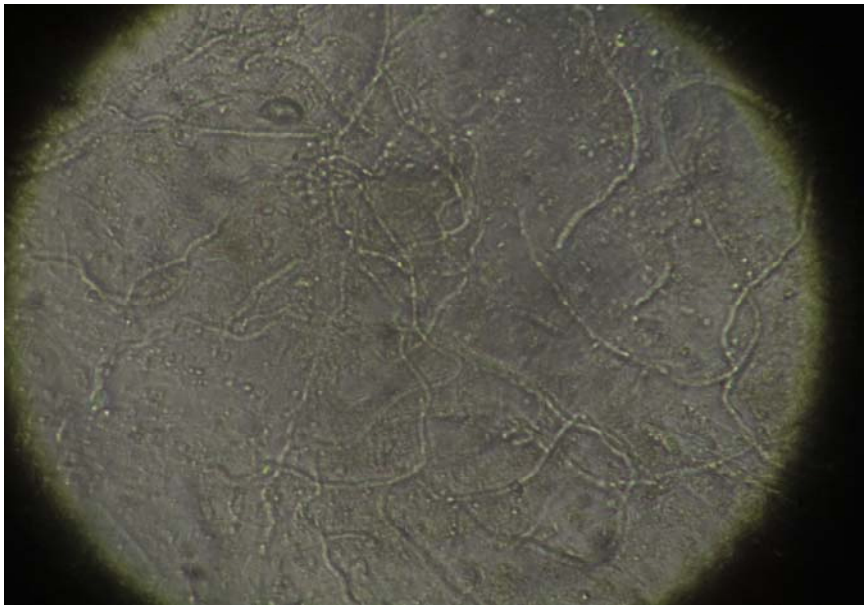


BEFORE TREATMENT

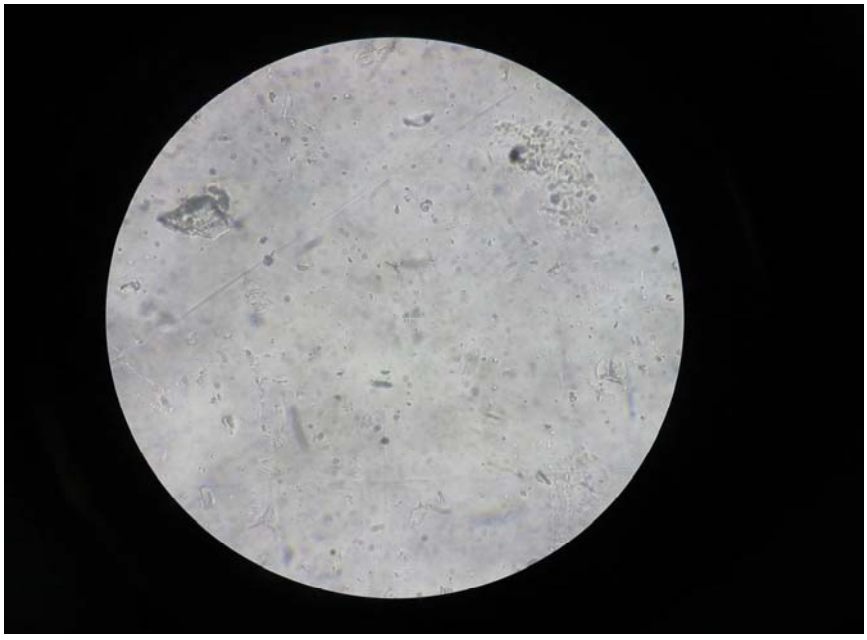


AFTER TREATMENT

BEFORE TREATMENT



AFTER TREATMENT



TOPICAL SERTACONAZOLE

BEFORE TREATMENT

AFTER 4 WEEKS OF TREATMENT

TOICAL SERTACONAZOLE

BEFORE TREATMENT

AFTER 2 WEEKS OF TREATMENT

AFTER 4 WEEKS OF TREATMENT

TOPICAL LULICONAZOLE

BEFORE TREATMENT

AFTER 2 WEEKS OF TREATMENT

AFTER 4 WEEKS OF TREATMENT

TOPICAL LULICONAZOLE

BEFORE TREATMENT

AFTER 4 WEEKS OF TREATMENT

TOPICAL LULICONAZOLE

BEFORE TREATMENT

AFTER TREATMENT

2 WEEKS

4 WEEKS

AFTER

6 WEEKS

TOPICAL TERBINAFINE

BEFORE TREATMENT

AFTER 2 WEEKS OF TREATMENT

TOPICAL TERBINAFINE

BEFORE TREATMENT

AFTER 4 WEEKS OF TREATMENT

TOPICAL TERBINAFINE

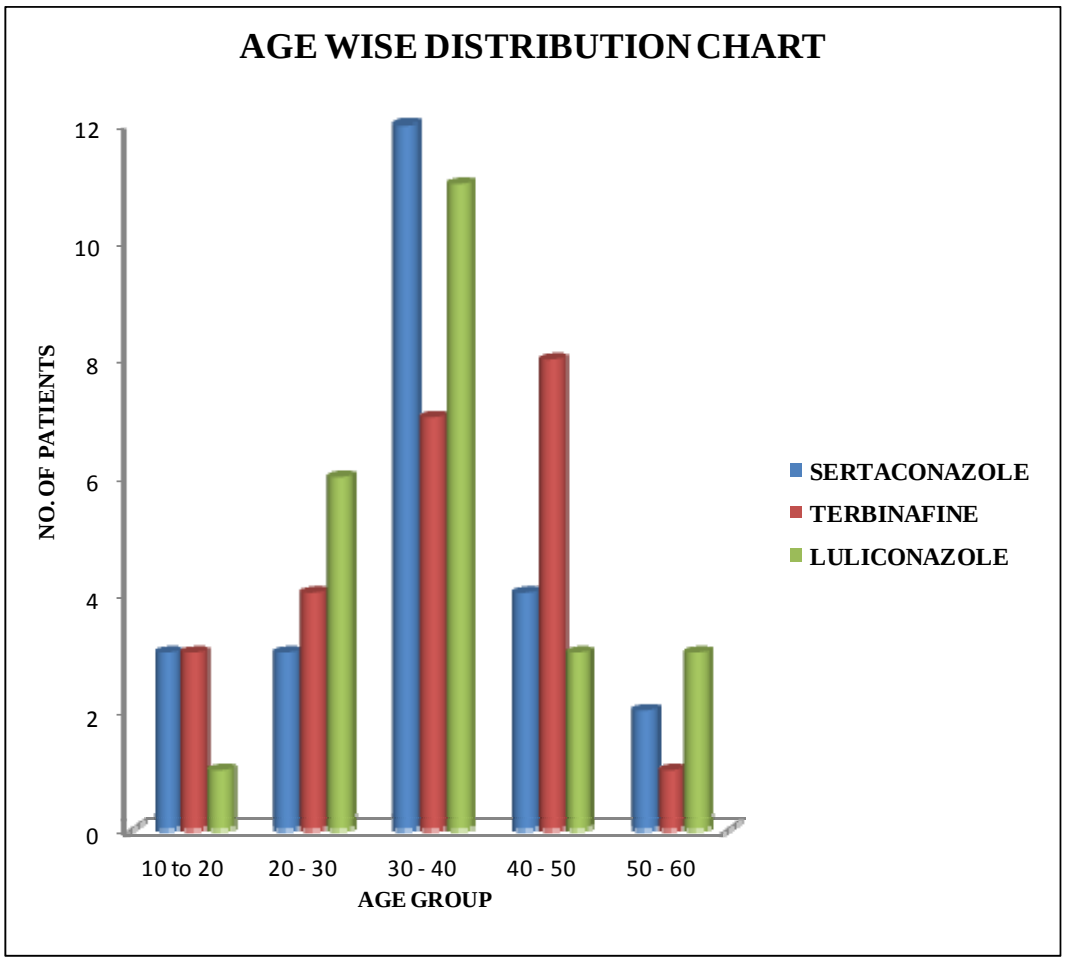
BEFORE TREATMENT

AFTER 2 WEEKS OF TREATMENT

TOPICAL TERBINAFINE

BEFORE TREATMENT

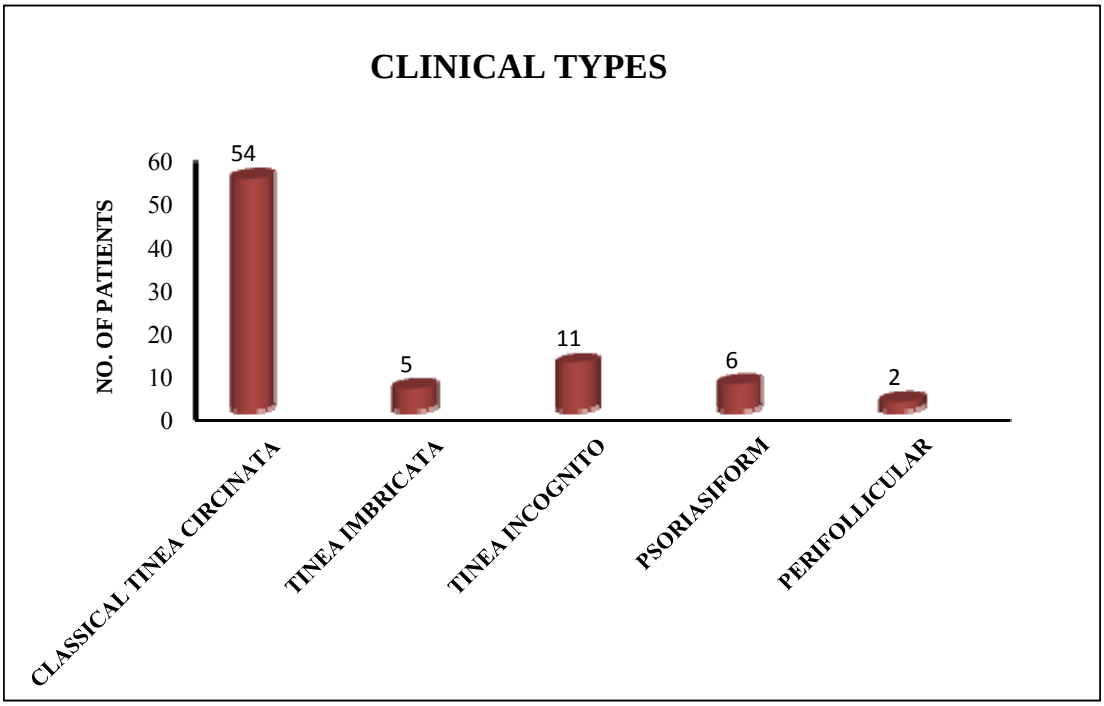
AFTER 2 WEEKS OF TREATMENT



The most common age group of involvement in our study was 30 – 40 years. The average age of the patient in the study group is 35.

CLINICAL TYPES

Type	No. of Patients	Percentage
CLASSICAL – TINEA CIRCINATA	54	69.2 %
TINEA IMBRICATA	5	6.4 %
TINEA INCOGNITO	11	14.1 %
PSORIASIFORM	6	7.69 %
PERIFOLLICULAR	2	2.56 %



Classical Tinea corporis was the most frequent clinical pattern noted in 54 patients followed by Tinea incognito in 11 patients, Psoriasiform in 6 patients and Tinea imbricata type in 5 patients. Least common type was Perifollicular type noted in 2 patients.

Of the 90 specimens studied, fungal elements were identified by positive KOH mounts in all specimens.

During the course of the study, 12 patients were lost in follow up so they were excluded from final analysis.

ASSOCIATED DERMATOLOGICAL CONDITIONS

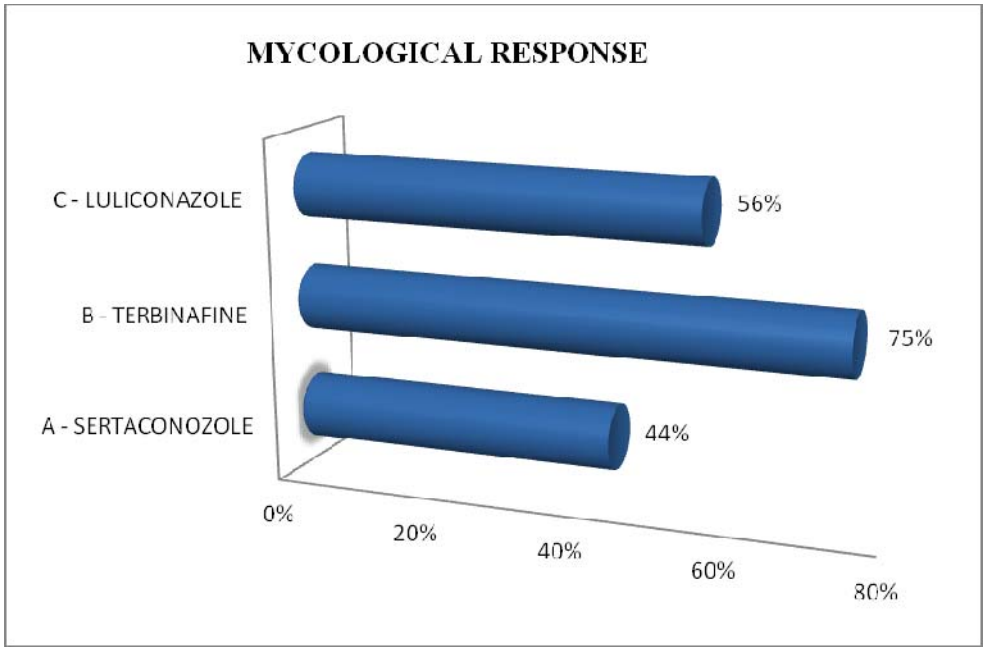
SNO	DERMATOLOGICAL CONDITION	NO OF PATIENTS
1	Psoriasis	2
2	Lichen planus	2
3	Vitiligo	1
4	Tinea versicolor	4
5	Idiopathic guttate hypomelanosis	3
6	Hansen	1
7	Erythrasma	1
8	Keratolysis punctata	2
9	Intertrigo	1
10	Perforating folliculitis	1

11	Lichen sclerosus atrophicus	1
12	Pitting of nails	3
13	Nevus achromicus	1

MYCOLOGICAL RESPONSE IN THE STUDY GROUP

GROUP	TOTAL	MYCOLOGICAL CURE	PERCENTAGE
A	**25**	**11**	**44**
B	**28**	**21**	**75**
C	**25**	**14**	**56**

Mycological cure rate was 44%, 75%, 56% in Group A, B, C respectively.

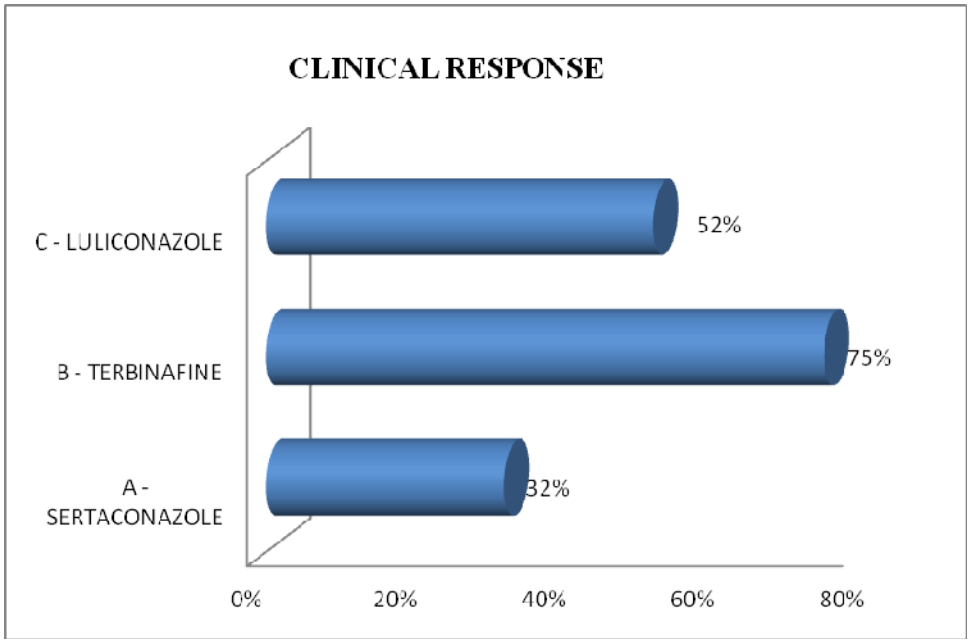


CLINICAL RESPONSE IN THE STUDY GROUP

Group	Cured	Total	Percentage
A	8	25	32
B	21	28	75
C	13	25	52

Clinical cure was observed in 32%, 75% and 52% patients in group A, B, C respectively.

No major adverse effect due to drug was observed in this study.



Red Marked values are P value

Interpretation of P value

If P value is 0.000 to 0.010 then denoted by ** => Significant at 1 % level

If P value is 0.011 to 0.050 then denoted by * => Significant at 5 % level

If P value is above 0.05 => Not Significant at 5 % level

If the P value is 0.000 it's represented as <0.001**

1. Group * Sex

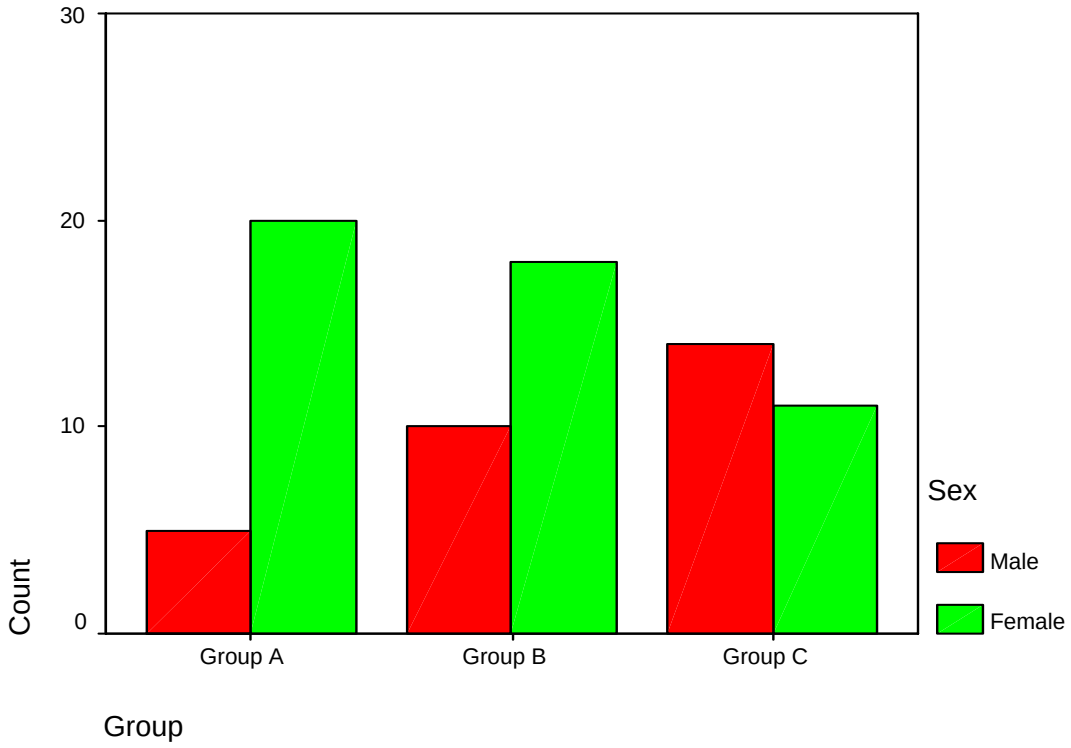
			Sex		Total
			Male	Female	
Group	Group A	Count	5	20	25
		% within Group	20.0%	80.0%	100.0%
		% within Sex	17.2%	40.8%	32.1%
	Group B	Count	10	18	28
		% within Group	35.7%	64.3%	100.0%
		% within Sex	34.5%	36.7%	35.9%
	Group C	Count	14	11	25
		% within Group	56.0%	44.0%	100.0%
		% within Sex	48.3%	22.4%	32.1%
Total		Count	29	49	78
		% within Group	37.2%	62.8%	100.0%
		% within Sex	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.976(a)	2	.031

Likelihood Ratio	7.130	2	.028
Linear-by-Linear Association	6.847	1	.009
No of Valid Cases	78		

A 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.29.



2. Group * DM

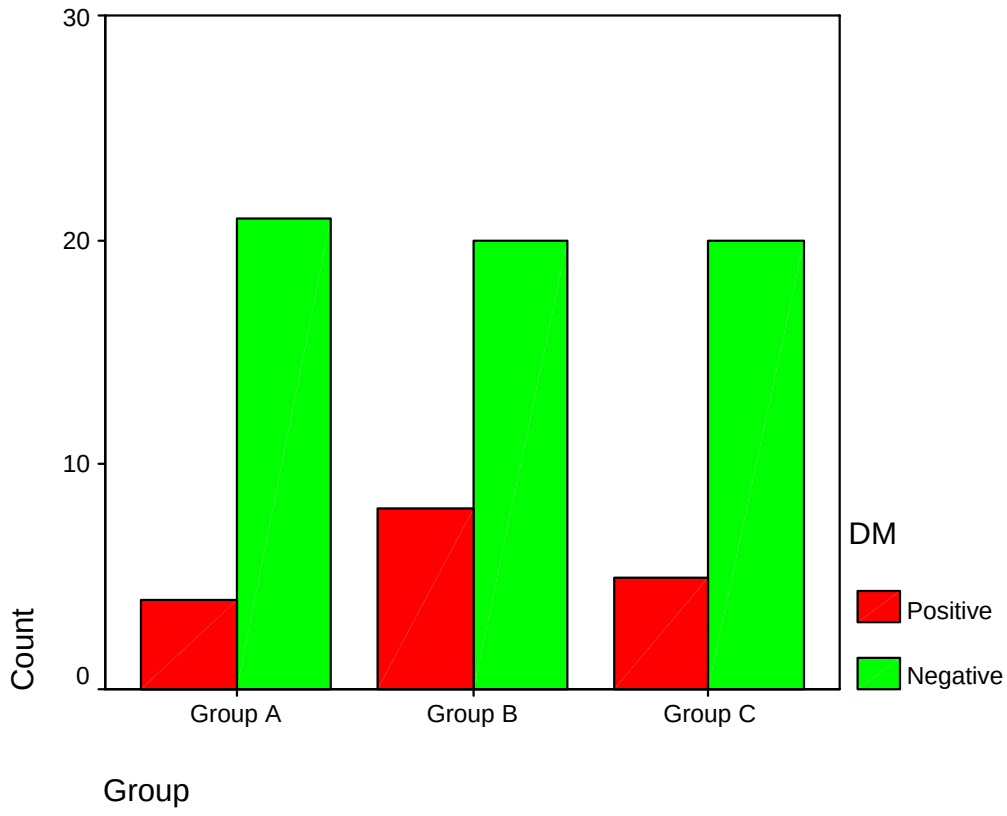
			DM		Total
			Positive	Negative	
Group	Group A	Count	4	21	25
		% within Group	16.0%	84.0%	100.0%
		% within DM	23.5%	34.4%	32.1%
	Group B	Count	8	20	28
		% within Group	28.6%	71.4%	100.0%
		% within DM	47.1%	32.8%	35.9%
	Group C	Count	5	20	25
		% within Group	20.0%	80.0%	100.0%
		% within DM	29.4%	32.8%	32.1%
Total		Count	17	61	78
		% within Group	21.8%	78.2%	100.0%
		% within DM	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.294(a)	2	.524
Likelihood Ratio	1.284	2	.526
Linear-by-Linear Association	.116	1	.734
No of Valid Cases	78		

A 0 cells (.0%) have expected count less than 5. The minimum expected

count is 5.45.


30
20
10
0
Count
Group A
Group B
Group C
Group
DM
Positive
Negative

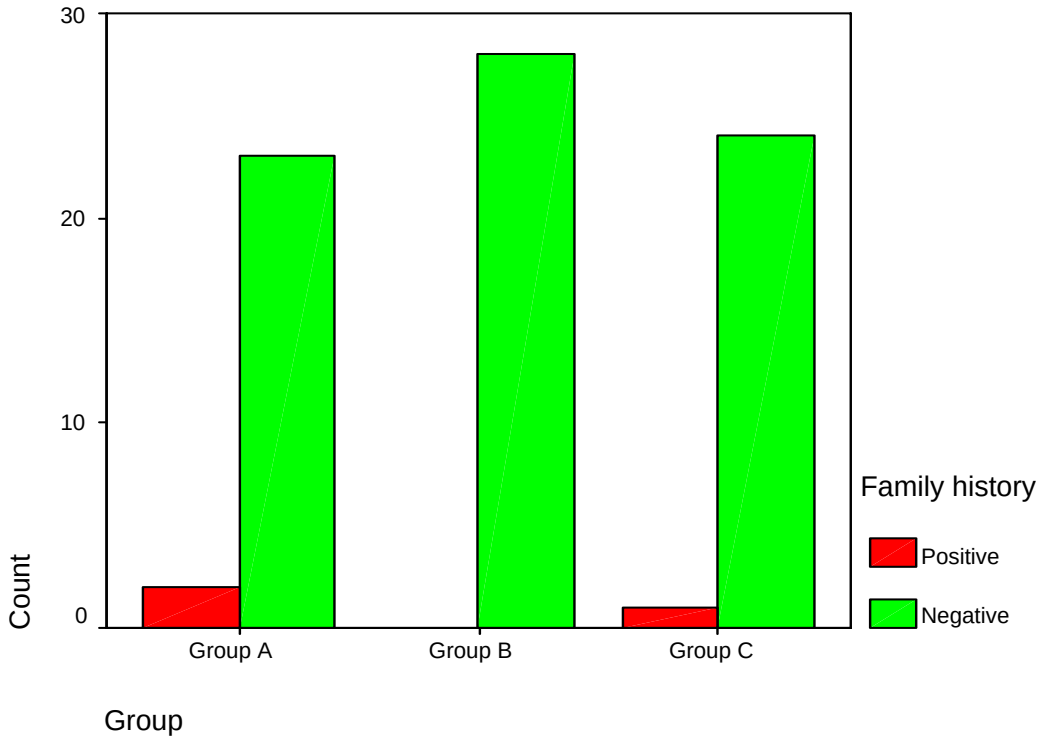
3. Group * Family history

			Family history		Total
			Positive	Negative	
Group	Group A	Count	2	23	25
		% within Group	8.0%	92.0%	100.0%
		% within Family history	66.7%	30.7%	32.1%
	Group B	Count	0	28	28
		% within Group	.0%	100.0%	100.0%
		% within Family history	.0%	37.3%	35.9%
	Group C	Count	1	24	25
		% within Group	4.0%	96.0%	100.0%
		% within Family history	33.3%	32.0%	32.1%
Total		Count	3	75	78
		% within Group	3.8%	96.2%	100.0%
		% within Family history	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.288(a)	2	.319
Likelihood Ratio	3.096	2	.213
Linear-by-Linear Association	.534	1	.465
No of Valid Cases	78		

A 3 cells (50.0%) have expected count less than 5. The minimum expected count is .96.


30
20
10
0
Count
Group A
Group B
Group C
Group
Family history
Positive
Negative

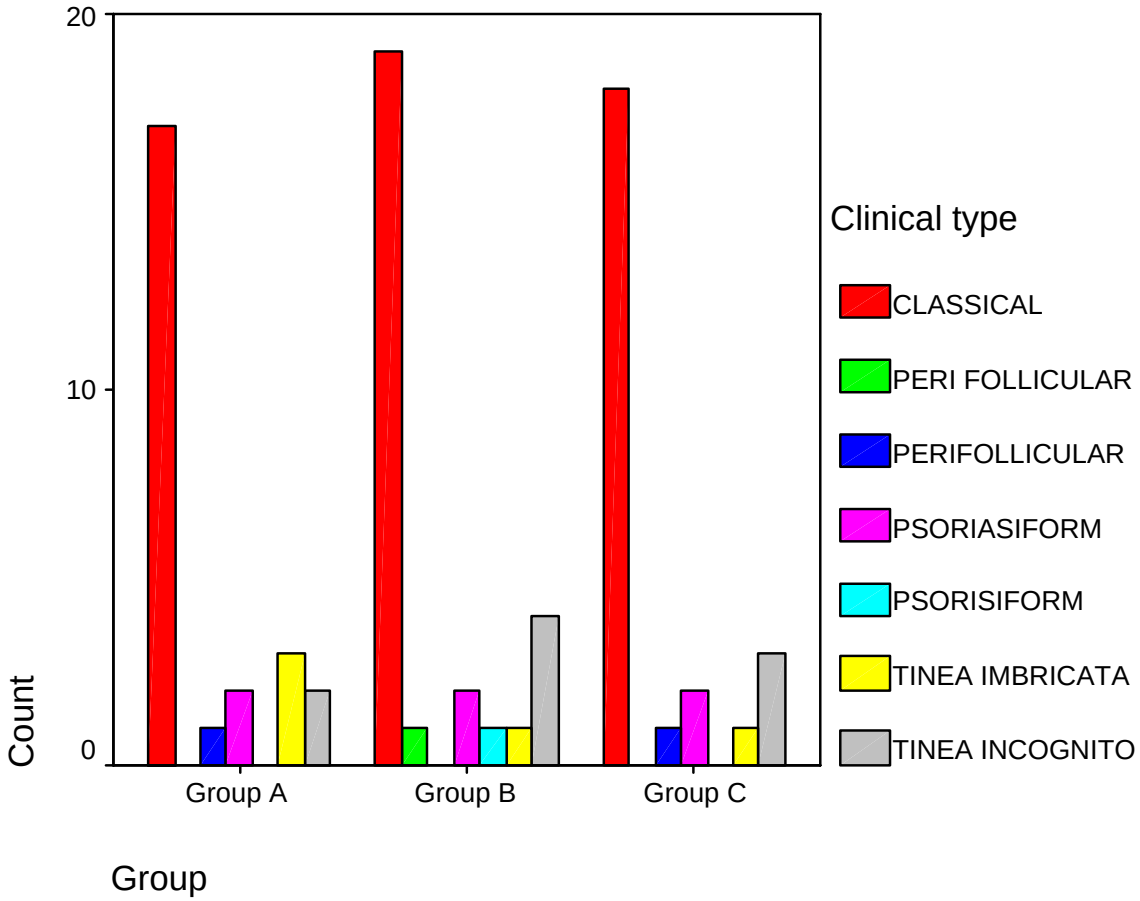
4. Group * Clinical type

			Clinical type							Total
			CLASSICAL	PERIFOLLICULAR	PERIFOLLICULAR	PSORIASIFORM	PSORISIFORM	TINEA IMBRICATA	TINEA INCOGNITO	
Group	Group A	Count	17	0	1	2	0	3	2	25
		% within Group	68.0%	.0%	4.0%	8.0%	.0%	12.0%	8.0%	100.0%
		% within Clinical type	31.5%	.0%	50.0%	33.3%	.0%	60.0%	22.2%	32.1%
	Group B	Count	19	1	0	2	1	1	4	28
		% within Group	67.9%	3.6%	.0%	7.1%	3.6%	3.6%	14.3%	100.0%
		% within Clinical type	35.2%	100.0%	.0%	33.3%	100.0%	20.0%	44.4%	35.9%
	Group C	Count	18	0	1	2	0	1	3	25
		% within Group	72.0%	.0%	4.0%	8.0%	.0%	4.0%	12.0%	100.0%
		% within Clinical type	33.3%	.0%	50.0%	33.3%	.0%	20.0%	33.3%	32.1%
Total		Count	54	1	2	6	1	5	9	78
		% within Group	69.2%	1.3%	2.6%	7.7%	1.3%	6.4%	11.5%	100.0%
		% within Clinical type	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.006(a)	12	.857
Likelihood Ratio	8.063	12	.780
No of Valid Cases	78		

A 18 cells (85.7%) have expected count less than 5. The minimum expected count is .32.



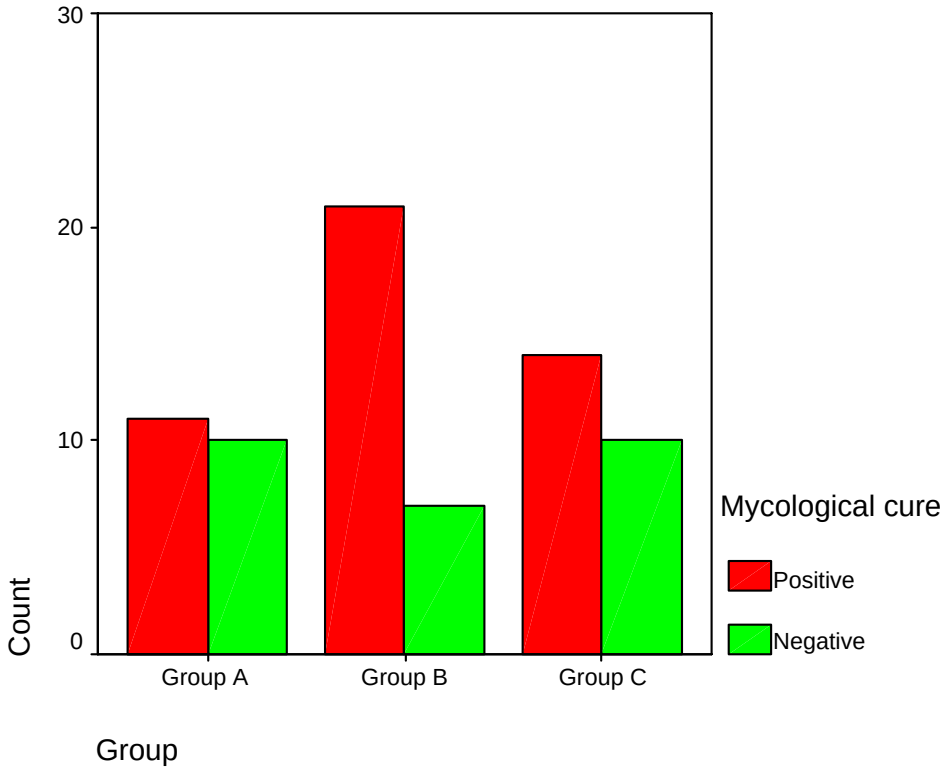
5. Mycological cure

			Mycological cure		Total
			Positive	Negative	
Group	Group A	Count	11	10	21
		% within Group	52.4%	47.6%	100.0%
		% within Mycological cure	23.9%	37.0%	28.8%
	Group B	Count	21	7	28
		% within Group	75.0%	25.0%	100.0%
		% within Mycological cure	45.7%	25.9%	38.4%
	Group C	Count	14	10	24
		% within Group	58.3%	41.7%	100.0%
		% within Mycological cure	30.4%	37.0%	32.9%
Total		Count	46	27	73
		% within Group	63.0%	37.0%	100.0%
		% within Mycological cure	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.970(a)	2	.226
Likelihood Ratio	3.040	2	.219
Linear-by-Linear Association	.116	1	.733
No of Valid Cases	73		

A 0 cells (.0%) have expected count less than 5. The minimum expected count is 7.77.


30
20
10
0
Count
Group A
Group B
Group C
Group
Mycological cure
Positive
Negative

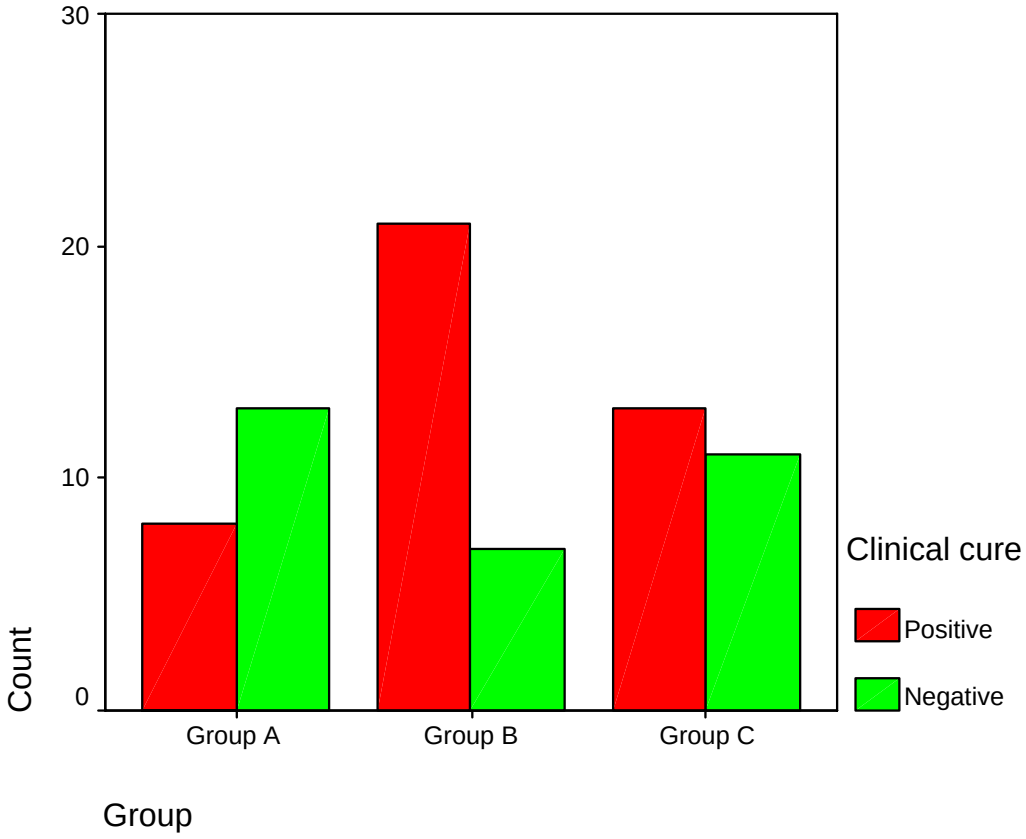
6. Group * Clinical cure

			Clinical cure		Total
			Positive	Negative	
Group	Group A	Count	8	13	21
		% within Group	38.1%	61.9%	100.0%
		% within Clinical cure	19.0%	41.9%	28.8%
	Group B	Count	21	7	28
		% within Group	75.0%	25.0%	100.0%
		% within Clinical cure	50.0%	22.6%	38.4%
	Group C	Count	13	11	24
		% within Group	54.2%	45.8%	100.0%
		% within Clinical cure	31.0%	35.5%	32.9%
Total		Count	42	31	73
		% within Group	57.5%	42.5%	100.0%
		% within Clinical cure	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.855(a)	2	.032
Likelihood Ratio	7.030	2	.030
Linear-by-Linear Association	.964	1	.326
No of Valid Cases	73		

A 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.92.


30
20
10
0
Count
Group A
Group B
Group C
Group
Clinical cure
Positive
Negative

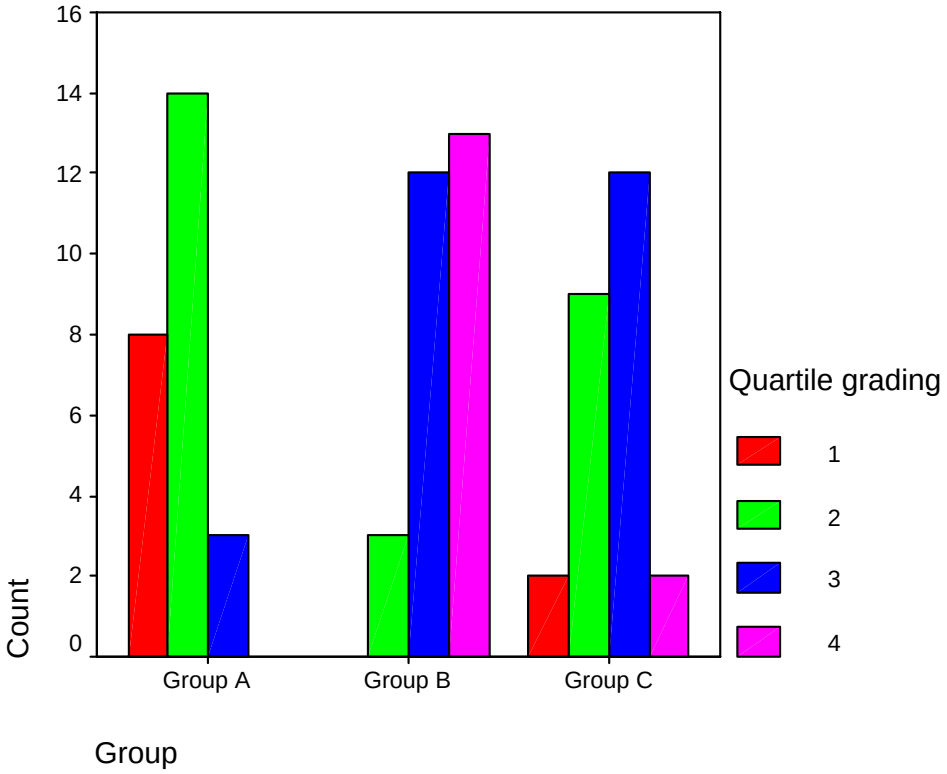
7. Group * Quartile grading

			Quartile grading				Total
			1	2	3	4	
Group	Group A	Count	8	14	3	0	25
		% within Group	32.0%	56.0%	12.0%	.0%	100.0%
		% within Quartile grading	80.0%	53.8%	11.1%	.0%	32.1%
	Group B	Count	0	3	12	13	28
		% within Group	.0%	10.7%	42.9%	46.4%	100.0%
		% within Quartile grading	.0%	11.5%	44.4%	86.7%	35.9%
	Group C	Count	2	9	12	2	25
		% within Group	8.0%	36.0%	48.0%	8.0%	100.0%
		% within Quartile grading	20.0%	34.6%	44.4%	13.3%	32.1%
Total		Count	10	26	27	15	78
		% within Group	12.8%	33.3%	34.6%	19.2%	100.0%
		% within Quartile grading	100.0%	100.0%	100.0%	100.0%	100.0%

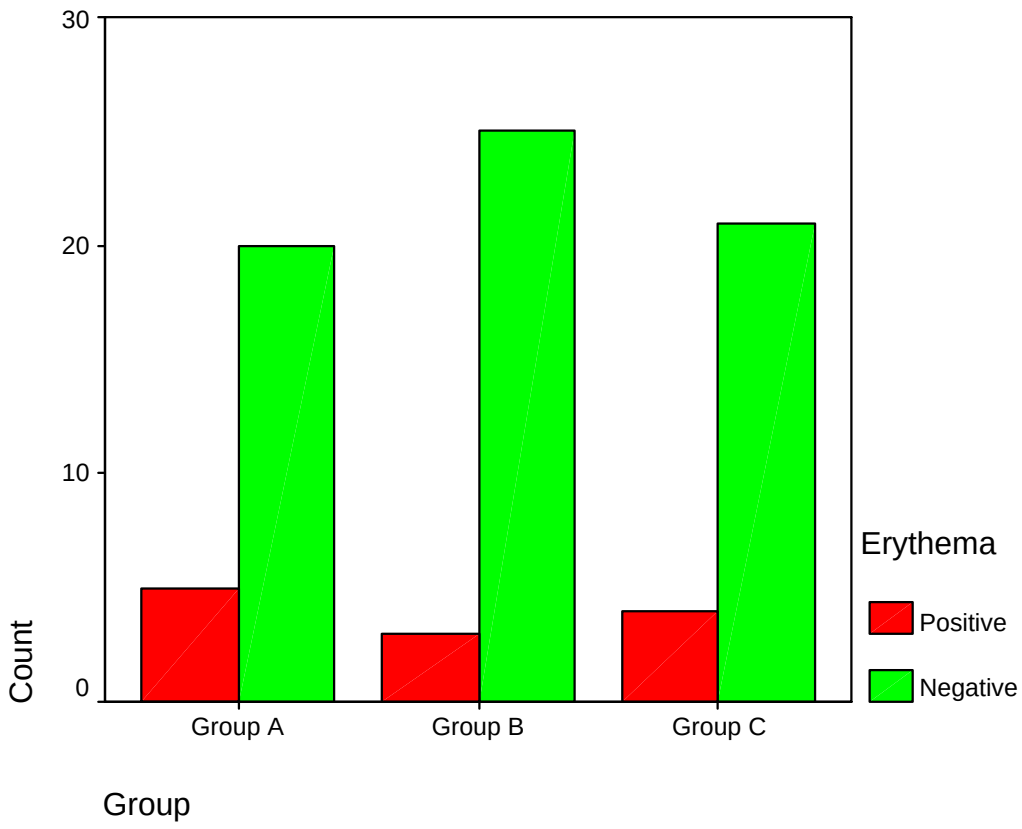
Chi-Square Tests

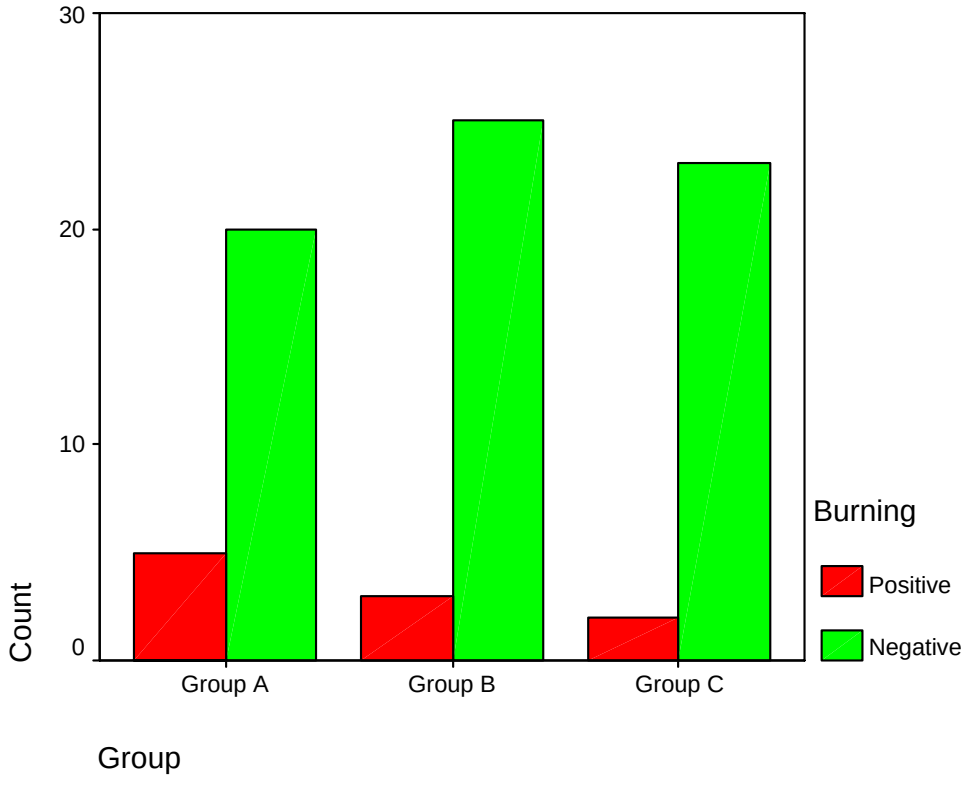
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	42.175(a)	6	.000
Likelihood Ratio	47.874	6	.000
Linear-by-Linear Association	8.095	1	.004
No of Valid Cases	78		

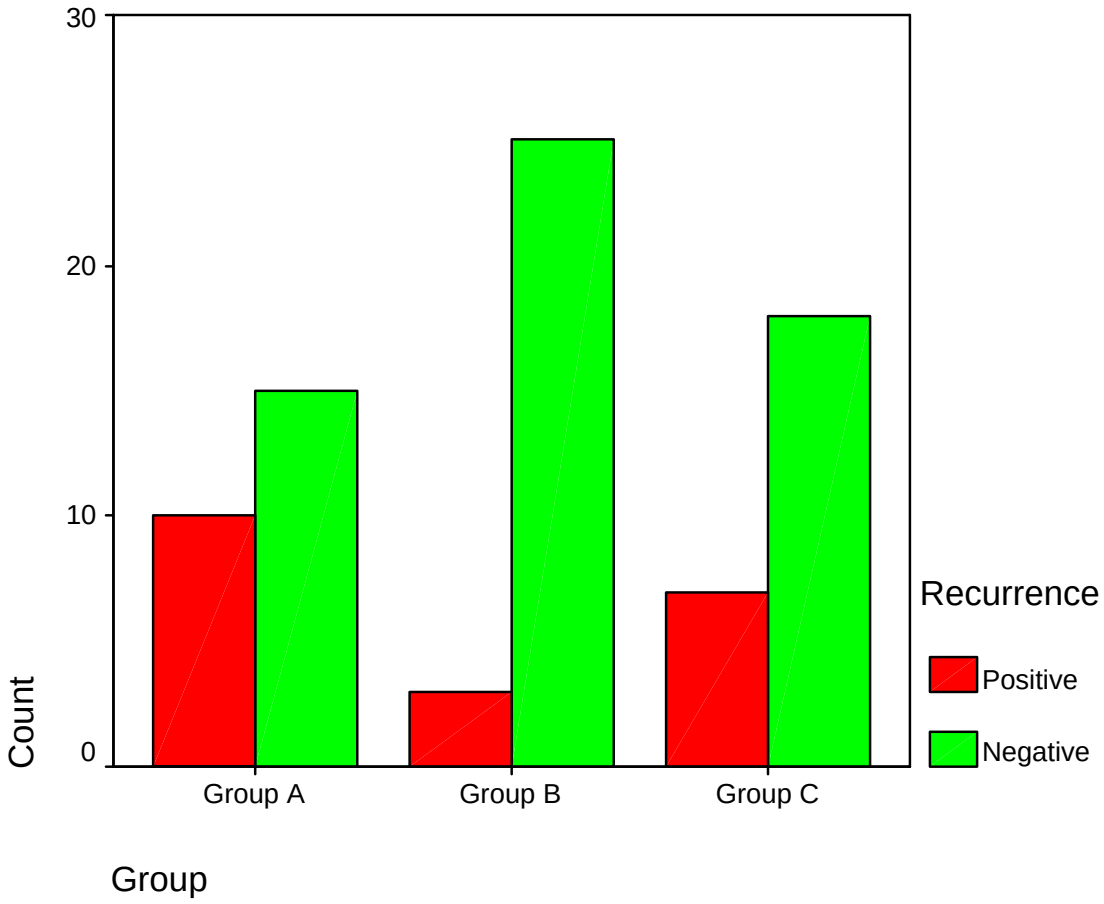
A 5 cells (41.7%) have expected count less than 5. The minimum expected count is 3.21.


16
14
12
10
8
6
4
2
0
Count
Group A
Group B
Group C
Group
Quartile grading
1
2
3
4

ADVERSE EFFECTS






30
20
10
0
Count
Group A
Group B
Group C
Group
Recurrence
Positive
Negative

ANOVA TABLE:

		Sum of Squares	df	Mean Square	F	Sig.
Age in years	Between Groups	34.748	2	17.374	.071	**.932**
	Within Groups	18449.867	75	245.998		
	Total	18484.615	77			
Duration	Between Groups	6.592	2	3.296	.781	**.462**
	Within Groups	316.587	75	4.221		
	Total	323.179	77			
Quartile grading	Between Groups	32.091	2	16.045	32.890	**.000**
	Within Groups	36.589	75	.488		
	Total	68.679	77			
DLQI - before	Between Groups	61.219	2	30.609	10.438	**.000**
	Within Groups	205.274	70	2.932		
	Total	266.493	72			
DLQI - after	Between Groups	41.886	2	20.943	15.363	**.000**
	Within Groups	95.429	70	1.363		
	Total	137.315	72			

BASED ON THE P VALUE OF QUARTILE GRADING AND DLQI,

THE STUDY CONDUCTED WAS SIGNIFICANT.

T-Test

1. Paired Samples Statistics (GROUP A)

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	**DLQI - before**	**6.36**	**25**	**1.705**	**.341**
	DLQI - after	**2.60**	**25**	**.707**	**.141**

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	DLQI - before & DLQI – after	25	.263	.205

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	DLQI - before DLQI - after	3.76	1.665	.333	3.07	4.45	11.289	24	.000

T-Test
2. Paired Samples Statistics (GROUP B)

	Mean	SD
DLQI - before	**6.96**	**1.67**
DLQI - after	**2.14**	**1.27**

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	DLQI - before	6.96	28	1.666	.315
	DLQI - after	2.14	28	1.268	.240

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	DLQI - before & DLQI – after	28	.335	.081

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	DLQI - before - DLQI - after	4.82	1.722	.326	4.15	5.49	14.812	27	.000

T-Test

3. Paired Samples Statistics (GROUP C)

	Mean	SD
DLQI - before	**8.65**	**1.79**
DLQI - after	**4.00**	**1.45**

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	DLQI - before	8.65	20	1.785	.399
	DLQI - after	4.00	20	1.451	.324

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	DLQI - before & DLQI – after	20	.406	.075

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	DLQI - before - DLQI – after	4.65	1.785	.399	3.81	5.49	11.649	19	.000

Tinea corporis can occur at any age but is most commonly seen during adolescent and preadolescent [59].

In our study the common age group affected was between 30 to 40 years compared to incidence in age group of 26 to 30 in a study conducted in chitwan district in Nepal [60].

There is a slight male preponderance [56, 61] in cases of Tinea corporis but in our study incidence was more in females than males attributed due to higher number of female respondents in our study, due to increased contact of mothers with infected children, due to tight clothing and also due to females involved in some strenuous labour leading to increased sweating which is a predisposing factor. Similar female preponderance was reported in a study conducted in chitwan district in Nepal [60]. The sex ratio is (1:1 for Group A; 1:4 for Group B, 2:3 for Group C).

Among the females the majority were housewives

Diabetes mellitus was one of the predisposing factors in our study[51].

The other dermatological conditions associated with Tinea corporis were Vitiligo, Psoriasis, Hansen's, Intertrigo, Keratolysis punctata, Erythrasma, Perforating folliculitis, Lichen sclerosus et atrophicus, Tinea versicolor,

Idiopathic guttate hypomelanosis, nail pitting , Lichen planus and Nevus achromicus.

In this study, direct microscopic examination was positive in all the samples.

Tinea corporis is known to be difficult to treat and often exerts a significant negative impact on the quality of life. The topical agents most commonly used for treatment of Tinea corporis are clotrimazole and other azoles, Terbinafine, nystatin, ciclopiroxolamine, amorolfine and other non specific measures like Whitfield ointment and castellani paint.

The newer antifungal agents have better pharmacokinetic profiles such as persistence in the stratum corneum for several months even after the discontinuation of therapy and fewer adverse reactions.

In our study terbinafine has high mycological cure rate with a statistically significant p value in efficacy than that of luliconazole and sertaconazole and ensuring that the patients are likely to complete the therapy compared to a study conducted in Jawahar lal Nehru medical college where sertaconazole was found to be as efficacious as terbinafine[62]. .Nearly 75% of patients showed both mycological and clinical cure completely compared to 92% in a study published in Paediatric infectious disease journal – june 1997 [62]. Adverse events with

terbinafine were very few. Only 1% of patients showed erythema, and only 2% felt burning sensation. Recurrence was seen only in 2% of patients.Most of the patients on Terbinafine showed faster mycological and clinical cure in 2 weeks compared to Sertaconazole and Luliconazole. Patients on sertaconazole and luliconazole showed recurrence.

Future

Terbinafine is an incredible topical anti fungal in the management of dermatophytosis and also onychomycosis. The use of topical Terbinafine is increasing every year. Patients are showing great satisfaction with the use of Terbinafine. Terbinafine has been in use for the past 17 years. It has proved to be an extremely safe therapy for treatment of dermatophytosis.

- ✓ Females are more commonly affected than males .
- ✓ Common age group is between 30 to 40 yrs.
- ✓ Diabetes was found to be a precipitating factor in few cases.
- ✓ Classical Tinea corporis is the commonest type.
- ✓ No specific systemic disease association in noted in this study.
- ✓ Therapeutic trial concludes that terbinafine is more efficacious, safe and tolerable than sertaconazole and luliconazole.
- ✓ Terbinafine is one of the most commonly used topical anti fungal in the treatment of dermatophytosis.
- ✓ It has a favourable mycological and pharmacokinetic profile.

Advantages are

- ✓ Good penetration at the site of application
- ✓ Persistence in skin for longer durations
- ✓ Fungicidal activity
- ✓ Short course of treatment
- ✓ The efficacy, short duration, lesser side effects, cost effectiveness of the Terbinafine gives a positive approach in the treatment of Superficial cutaneous mycoses like Tinea corporis .

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APPENDIX

KEY TO MASTER CHART

Sex

M - Male

F - Female

Duration

M - Months

Wks - Weeks

Past H/o

HT - Hypertension

DM - Diabetes mellitus

Other Association

KP - Keratolysis punctata

TV - Tinea Versicolar

IGH - Idiopathic guttate hypomelanosis

LP - Lichen planus

Lab Diagnosis

KOH - Potassium Hydroxide Examination

\+ - Positive

\- - Negative

PROFORMA

Serial Number

Name Date

Age Address and contact number

Sex

Occupation

Complaints:

Duration

Onset

Site

Associated Symptoms

Precipitating factor

H/o exposure to STD

Past H/o : HT/DM/Peripheral vascular Disease/Varicose Veins/ Immunosuppressive therapy/ Atopic dermatitis.

Family H/o : Other members affected or not.

Personal H/o : Smoking / Alcoholic

Vegetarian / Mixed diet.

Treatment H/o:

Allopathic → Topical

Indigenous → Topical

Systemic Systemic

General Examination:

Anaemia / Pedal edema / Jaundice / Clubbing / Cyanosis /

Generalized lymphadenopathy

CVS PR

RS BP

Abdomen

CNS

Musculoskeletal System

Skin:

Types :

Hair :

Mucosa :

Nail :

Others :

LAB INVESTIGATION

Blood

Hb% SGOT

TC SGPT

DC SAP

ESR	STP
Platelet Count	STB
B.Sugar	KOH Mount
B.Urea	Culture
S.Creatine	Biopsy

Urine

Albumin

Sugar

Deposits

RX GIVEN

Topical	Systemic

Response to therapy

Follow up

Remarks

CONSENT FORM

Mr/Mrs/Miss:

Age:

Address:

Phone:

Name of the procedure:

I Undersigned Mr /Mrs /Miss
have been explained regarding above said procedure in my regional language. I am fully aware of the possible side effects and risks involved in this procedure. I am also aware that this procedure may not always be successful and no guarantee can be made for successful outcome of the procedure.

I have been explained that this procedure will be performed by Dr. M. Mani surya kumar. I have also been explained that during this procedure if any complication arises, I may be given any emergency treatment best suitable without asking my prior permission.

I further state that I have carefully read and understood all the information provided in this form and with full conscious mind I hereby give my consent for the said procedure with its risks involved.

Signature of the patient / Thumb impression:

Signature of the parent / guardian (for minors):

Name and relationship if signed by other than parent:
Witness:

Name: Signature:

Date:

MASTER CHART – SERTACONAZOLE (GROUP A)

NAME	AGE/SEX	OCCUPATION	DURATION	HT	DM	FAMILY HISTORY	CLINICAL TYPE	OTHERS	LAB DIAGNOSIS	MYCOLOGICAL CURE	CLINICAL CURE	QUARTILE GRADING	DLQI		COMPLICATIONS		
													BEFORE	AFTER	ERYTHEMA	BURNING	RECURRENCE
SABARINATH	47/M	Manson	4 M	-	-	-	CLASSICAL	-	KOH +	+	+	1	10	4	-	-	+
RENUKA	23/F	House wife	2M	+	-	-	CLASSICAL	-	KOH +	-	-	1	9	4	-	-	-
MAHALAKSHMI	37/F	House wife	6 M	-	-	-	CLASSICAL	KP	KOH +	+	+	2	5	3	-	-	-
SULOCHANA	42/F	House wife	2 M	-	-	-	CLASSICAL	-	KOH +	+	-	1	4	3	-	+	-
SANDHIYA	30/F	House wife	1 M	+	-	-	CLASSICAL	-	KOH +	+	+	2	5	3	+	-	-
RICHARD	42/M	Manual labourer	1 M	-	-	+	CLASSICAL	TV	KOH +	-	-	2	5	3	-	-	+
AYESHA	40/F	House wife	4 M	-	+	-	CLASSICAL	-	KOH +	+	+	2	5	3	-	-	+
RUBAN	38/M	Contractor	4 M	-	-	-	CLASSICAL	ERYTHRASMA	KOH +	-	-	2	5	2	+	-	+
BHARATHI	60/F	Water board worker	4M	-	-	-	TINEA IMBRICATA	-	KOH +	+	+	2	7	2	+	-	-
ARPITHA	37/F	House wife	1M	+	+	-	CLASSICAL	IGH	KOH +	-	-	3	8	2	-	-	-
RANJINI	40/F	House wife	4 M	-	-	-	PSORIASIFORM	-	KOH +	+	-	1	7	1	-	-	-
RAMYA	40/F	House wife	3M	-	+	-	CLASSICAL	-	KOH +	-	-	2	6	2	-	+	+
LAVANYA	26/F	House wife	5M	-	-	-	CLASSICAL	-	KOH +	-	-	3	8	2	-	+	-

RAVI	29/M	House wife	5M	-	-	-	CLASSICAL	-	KOH +	-	-	2	8	2	-	-	-
BALU	15/M	Student	1M	-	-	-	CLASSICAL	-	KOH +	-	-	2	8	3	-	+	+
KUMARI	28/F	House wife	6 M	-	-	-	TINEA IMBRICATA	-	KOH +	-	+	2	8	3	-	-	+
LEELA	30/F	House wife	3 M	+	-	-	TINEA IMBRICATA	-	KOH +	-	-	2	8	3	-	-	+
DHANAM	58/F	Water Board worker	6 M	-	-	-	PERIFOLLICULAR	IGH	KOH +	+	+	1	4	2	-	-	-
SUPRIYA	17/F	Bottle washer	1 M	-	-	-	PSORIASIFORM	-	KOH +	+	+	3	8	3	-	-	+
PUSHPAM	36/F	Office Staff	2 M	-	-	+	TINEA INCOGNITO	Pitting	KOH +	-	-	2	6	3	-	-	+
SRIVIDYA	38/F	House wife	4 M	+	-	-	CLASSICAL	-	KOH +	-	-	2	5	3	+	-	-
MANJU	44/F	House wife	3 M	-	-	-	CLASSICAL	-	KOH +	-	-	1	5	3	-	-	-
ASHWATH	20/F	Sweeper	6 M	-	-	-	CLASSICAL	-	KOH +	+	-	1	5	2	+	-	-
SUGUNA	70/F	House Wife	1M	-	+	-	CLASSICAL	TV	KOH +	-	-	1	5	2	-	-	-
MEERA	32/F	House Wife	3 M	+	-	-	TINEA INCOGNITO	-	KOH +	+	+	2	5	2	-	+	-

-

MASTER CHART – TERBINAFINE (GROUP B)

NAME	AGE/SEX	OCCUPATION	DURATION	HT	DM	FAMILY HISTORY	CLINICAL TYPE	OTHERS	LAB DIAGNOSIS	MYCOLOGICAL CURE	CLINICAL CURE	QUARTILE GRADING SCALE	DLQI		COMPLICATION		
													BEFORE	AFTER	ERYTHEMA	BURNING	RECURRENCE
PAVITHRA	50/F	House Wife	1M	-	-	-	CLASSICAL	Pitting	KOH +	+	+	4	10	2	-	-	-
SRIRAM	32/M	Office Staff	2 M	-	+	-	TINEA IMBRICATA	Perforation disorder	KOH +	+	+	4	6	1	-	-	-
RAJA	21/M	Postal Staff	1M	-	-	-	CLASSICAL	-	KOH +	-	+	3	7	4	-	-	-
LAKSHMI	29/F	Juice Maker	1 M	+	+	-	CLASSICAL	-	KOH +	-	+	3	8	2	-	-	-
MICHEAL	24/M	Office Staff	2 M	-	-	-	CLASSICAL	TV	KOH +	+	+	3	9	3	-	-	-
RASHMI	43/F	House Wife	3 M	-	-	-	CLASSICAL	-	KOH +	+	-	3	6	3	-	-	-
DEEPA	35/F	House Wife	8 M	-	-	-	PSORISIFORM	-	KOH +	-	-	2	9	5	-	-	-
SUSANE	65/F	House Wife	3 M	+	+	-	PSORIASIFORM	-	KOH +	+	-	3	7	2	-	+	-
BHAVANA	26/F	House Wife	2 M	-	-	-	TINEA INCOGNITO	LSA	KOH +	+	-	3	8	2	-	-	-

SUSHMA	38/F	Rice mill labourer	4 M	-	-	-	CLASSICAL	-	KOH +	+	+	4	7	1	+	-	+
THULASI	60/F	Farmer	10 M	+	-	-	CLASSICAL	-	KOH +	+	-	3	8	3	-	-	-
KARTHICK	45/M	Farmer	8 M	-	-	-	CLASSICAL	Hansen's	KOH +	+	+	4	9	1	-	-	-
KAVITHA	25/F	House Wife	1 M	-	-	-	CLASSICAL	-	KOH +	+	+	4	6	2	-	-	-
SRIPATHY	29/M	Driver	2 M	-	-	-	CLASSICAL	Psoriasis	KOH +	-	-	2	8	5	-	-	-
MANIKKAM	18/M	Student	3 M	-	-	-	CLASSICAL	-	KOH +	+	+	4	6	1	-	+	-
SAVITHRI	52/F	House Wife	3M	+	+	-	CLASSICAL	-	KOH +	+	+	4	5	1	+	-	-
SORNAKILI	60/F	House Wife	2 M	-	+	-	CLASSICAL	LP	KOH +	+	+	4	4	1	-	-	+
MEENAKSHI	55/F	Servant maid	2 M	-	-	-	TINEA INCOGNITO	Intertrigo	KOH +	-	+	3	3	1	-	-	-
FATHIMA	13/F	--	7 M	-	-	-	PERI FOLLICULAR	-	KOH +	-	+	3	6	2	-	-	-
DHIVYA	21/F	House Wife	1 M	-	-	-	CLASSICAL	-	KOH +	+	+	4	5	0	-	-	-
ARUN	22/M	Student	2 M	-	-	-	CLASSICAL	Pitting	KOH +	-	-	2	5	4	-	-	-
LOKESHWARAN	32/M	Welder	1 M	-	+	-	CLASSICAL	TV	KOH +	+	+	4	8	1	-	-	-

SURUSH	**32 / M**	**Chemist**	**3 M**	**-**	**-**	**-**	**TINEA INCOGNITO**	**-**	**KOH +**	**+**	**+**	**4**	**7**	**1**	**+**	**+**	**-**
GOWRI	**55 /F**	**Farmer**	**4 M**	**+**	**+**	**-**	**PSORIASIFORM**	**-**	**KOH +**	**+**	**+**	**3**	**8**	**3**	**-**	**--**	**+**
SHANKARAN	**64 /F**	**Watchman**	**5 M**	**-**	**-**	**-**	**CLASSICAL**	**-**	**KOH +**	**+**	**+**	**3**	**7**	**2**	**-**	**-**	**-**
RAJESH	**30 / M**	**Medical Staff**	**7 M**	**-**	**-**	**-**	**CLASSICAL**	**-**	**KOH +**	**+**	**+**	**4**	**9**	**2**	**-**	**-**	**-**
MARADATHAM	**60 /F**	**House Wife**	**4 M**	**+**	**-**	**-**	**CLASSICAL**	**-**	**KOH +**	**+**	**+**	**4**	**8**	**2**	**-**	**-**	**-**
THENMOZHI	**65 /F**	**Servant Maid**	**1 M**	**+**	**+**	**-**	**TINEA INCOGNITO**	**-**	**KOH +**	**+**	**+**	**3**	**6**	**3**	**-**	**-**	**-**

MASTER CHART – LULICONAZOLE (GROUP C)

NAME	AGE/SEX	OCCUPATION	DURATION	HT	DM	FAMILY HISTORY	CLINICAL TYPE	OTHERS	LAB DIAGNOSIS	MYCOLOGICAL CURE	CLINICAL CURE	QUARTILE GRADING	DLQI		COMPLICATION		
													BEFORE	AFTER	ERYTHEMA	BURNING	RECURRENCE
NAGAVALLI	30/F	Farmer	1M	+	+	-	CLASSICAL	Psoriasis	KOH +	+	+	4	10	2	-	-	-
PRAKASH	44/M	Farmer	2 M	+	-	-	TINEA IMBRICATA	LP	KOH +	+	+	3	11	6	-	-	-
KRISHNAN	28/M	Merchant	1 M	-	-	-	CLASSICAL	-	KOH +	+	+	3	7	3	-	-	-
GOPAL	67/M	Hotel staff	6 M	+	-	-	CLASSICAL	-	KOH +	-	-	3	8	4	-	-	-
KALKI	25/F	House wife	3 M	+	+	-	CLASSICAL	Vitiligo	KOH +	-	-	3	9	5	-	-	-
RADHA	41/F	House wife	1 M	-	-	-	CLASSICAL	Keratolysis punctata	KOH +	-	-	2	7	5	-	-	+
ARUMUGAN	64/M	Manson	1 M	-	-	-	CLASSICAL	-	KOH +	+	+	2	9	5	+	-	-
VINCENT	32/M	Electrician	5 M	-	-	-	CLASSICAL	-	KOH +	+	+	2	8	4	+	-	-
JAGDISH	32/M	Merchant	5 M	-	-	-	PSORIASIFORM	-	KOH +	-	-	1	12	7	--	-	-
SMILEY	30/F	Office staff	5 M	-	+	-	CLASSICAL	-	KOH +	-	-	2	6	4	-	-	+
TENNYSON	42/M	Driver	1 M	-	+	-	CLASSICAL	-	KOH +	+	+	2	9	6	-	-	-
ANWAR	21/M	Office Staff	2 M	-	-	-	CLASSICAL		KOH +	-	-	3	10	4	-	-	-
PRAGATHI	18/F	Student	5 M	-	-	-	CLASSICAL	Nevus achromicus	KOH +	+	+	3	9	4	-	-	+

RUKUMANI	35/F	House Wife	3 M	-	-	+	CLASSICAL	-	KOH +	+	+	3	6	2	+	-	+
GLADI	30/F	House wife	3 M	+	-	-	CLASSICAL	-	KOH +	+	+	4	9	2	-	+	+
MINTU	49/F	House wife	1 M	-	-	-	CLASSICAL	-	KOH +	+	+	3	12	3	-	-	-
SUDHAKAR	45/M	Welder	2 M	-	+	-	PERIFOLLICULAR	-	KOH +	+	+	3	6	2	-	-	-
KANDAPPAN	30/M	LIC agent	1 M	-	-	-	CLASSICAL	-	KOH +	+	+	3	8	3	-	-	-
ANNAKILI	29/F	House wife	2 M	-	-		TINEA INCOGNITO	IGH	KOH +	-	-	2	9	4	-	-	-
PRABHAKAR	40/M	Electrician	6 M	-	-	-	TINEA INCOGNITO	-	KOH +	-	-	2	8	5	-	-	-
CHANDRASEKAR	41/M	Hotel Staff	3 M	-	-	-	CLASSICAL	-	KOH +	-	-	1	7	4	-	-	+
RAJU	17/M	Student	1 M	-	-	-	CLASSICAL	-	KOH +	-	-	3	8	4	-	+	-
MANOHARI	29/F	House wife	3 M	-	-	-	PSORIASIFORM	-	KOH +	+	+	3	9	5	-	-	-
RAJESHWARI	26/F	House wife	1 M	-	-	-	TINEA INCOGNITO	-	KOH +	+	-	2	9	5	+	-	-
UMA	20/F	House wife	3 M	-	-	-	CLASSICAL	-	KOH +	-	-	2	8	5	-	-	+

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